





FLORA OF JAMAICA

VOL. IV.

DICOTYLEDONS

FAMILIES LEGUMINOSÆ TO CALLITRICHACEÆ

FLORA OF JAMAICA

CONTAINING DESCRIPTIONS OF THE FLOWERING PLANTS KNOWN FROM THE ISLAND

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VOL. IV.

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FAMILIES LEGUMINOSÆ TO CALLITRICHACEÆ

WITH 114 TEXT ILLUSTRATIONS

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P R E F A C E

THE present volume continues the systematic account of the flowering plants of Jamaica^{*} on the same lines as Volume III. There has been some delay in publication owing to conditions prevailing during the last five years. The fact that printing was begun in 1917 will explain the absence of reference, especially in the earlier sheets, to papers which may have appeared subsequently.

We are again indebted for the loan of specimens to the Government of Jamaica, and to various institutions and individuals previously mentioned, especially to the Directors of the Royal Botanic Gardens, Kew and Edinburgh, the Bristol Museum, and the Naturhistoriska Riks-Museum at Stockholm.

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(In addition to those already enumerated in Vol. III.)

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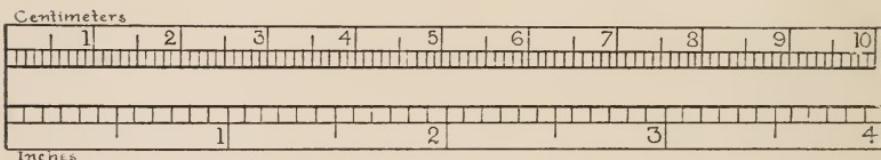
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CORRECTIONS AND ADDITIONS

Page 44, lines 1 and 4 of Key, for Leaves read Leaflets.

- „ 77, line 4, before Browne read Sloane Herb. v. 91, 92 !
„ 85, „ 3, for 361 read 360, and for 361 (occurring later) read 363.
„ 168, „ 4, for opposite read alternate.
„ 230, „ 6, after 1791 add (in part), and for L. read Jacq.
„ 239, „ 5 from bottom, for Triapteris read Triopteris.
„ 245, „ 5 of description of fig., for L. read Jacq.
„ 247, „ 6, and line 4 from bottom, for L. read Jacq.
„ 303, „ 7 from bottom, after arborea &c. read Sloane.
„ 307, „ 2, add Oil Nut.
-

For the convenience of workers a comparative scale showing centimeters and inches is given below.



CONSPECTUS OF THE FAMILIES CONTAINED IN
THIS VOLUME

DICOTYLEDONS

Stems with open bundles. Leaves net-veined. Floral parts generally in fours or fives, sometimes in threes. Embryo with two cotyledons.

FAMILIES *LEGUMINOSÆ* TO *EUPHORBIACEÆ*

(Calyx free from the ovary. Petals distinct)

Fam. 39. **Leguminosæ.** Fls. irregular, generally 2-sexual, or regular generally polygamous. Sepals more or less united; generally 5, imbricate in the irregular flowers, the fifth lowest; 5 or 4, valvate in the regular flowers. Petals as many as the sepals; in the irregular flowers the fifth highest—outside in *Papilionatae*, inmost in *Cæsalpinieæ*. Carpel one. Trees, shrubs, or herbs. Leaves alternate, usually compound, generally stipulate. *Fruit a pod, sometimes splitting into 1-seeded joints, sometimes not splitting open, rarely drupe-like.* Endosperm wanting or scanty.

Fam. 40. **Geraniaceæ (Geranium).** Fls. 2-sexual, regular. Sepals and petals distinct, imbricate. Stamens 10. *Carpels 5, united with the axis, produced above into a beak.* Herbs. Leaves simple, palmately lobed, opposite, stipulate. Fruit a capsule separating elastically into 5 1-seeded parts.

Fam. 41. **Oxalidaceæ (Oxalis).** Fls. 2-sexual, regular. Sepals 5, imbricate. Petals 5, twisted in bud. Stamens 10. Ovary 5-celled; styles 5. Herb. *Leaves digitately 3-foliolate, alternate, stipulate.* Fruit 5-celled, a capsule.

Fam. 42. **Linaceæ (Linum).** Fls. 2-sexual, regular. Sepals and petals 5, imbricate; petals generally twisted in bud, fugacious. Stamens 5. Ovary 5-celled. Perennial herb. *Leaves simple, alternate.* Fruit a capsule, 5-celled.

Fam. 43. **Erythroxylaceæ (Erythroxylon).** Fls. 2-sexual, regular. Calyx persistent; segments 5, imbricate. Petals 5. Stamens 10, united below into a cup. *Ovary 3-celled, with 2 cells underdeveloped.* Shrubs or trees. Leaves simple, alternate; *stipule one, within the petiole.* Fruit a drupe with one seed.

Fam. 44. **Zygophyllaceæ.** Fls. hermaphrodite, regular. Sepals and petals usually 5, imbricate. Stamens 10. Ovary 2-12-celled; *styles united*. Herbs, shrubs, or trees. Leaves abruptly pinnate, opposite, stipulate. *Fruit composed of 2 to 12 cocci.*

Fam. 45. **Rutaceæ.** Fls. hermaphrodite, polygamous, or diœcious, regular (but corolla oblique in *Ravenia*), parts usually in fours or fives. Sepals and petals usually imbricate. Stamens as many as, or twice as many as, the petals, or numerous. Disk between stamens and ovary. Carpels 4 or 5 (8 in *Peltostigma*), united into a single 4-5-celled ovary, or free at the base and united in styles or stigmas, or altogether free and 1-celled. Shrubs or trees, *usually gland-dotted and strongly smelling*. Leaves usually compound and alternate, without stipules.

Fam. 46. **Simarubaceæ.** Fls. small, unisexual or polygamous, regular. Calyx 3-5-lobed. Petals 3-5, usually imbricate. Stamens at the base of a disk, as many as, or twice as many as, the petals. Ovary 2-5-lobed, 1-5-celled, or 3-5 free carpels; Styles 2-5. Shrubs or trees: Leaves simple or compound, alternate, without stipules.

Fam. 47. **Burseraceæ.** Fls. 2-sexual, or polygamous, regular. Calyx 3-6-lobed. Petals 3-6, valvate, deciduous. Disk generally ring-like. Stamens twice as many as the petals. Ovary 2-5-celled; styles very short. Trees or shrubs. Leaves simple or pinnate with an odd leaflet, alternate, without stipules. Fruit drupaceous.

Fam. 48. **Meliaceæ.** Fls. 2-sexual, regular. Calyx 4-5-lobed, imbricate. Petals 4-5, imbricate, convolute, or valvate. Disk various. Filaments united more or less into a tube, or adherent to the columnar disk (*Cedrela*). Ovary 2-5-celled. Trees or shrubs. Leaves compound, alternate, without stipules. Fruit a capsule or drupe.

Fam. 49. **Malpighiaceæ.** Fls. 2-sexual, regular. Calyx 5-cleft, each of 4 lobes usually with 2 glands outside. Petals 5, clawed. Stamens 10. Carpels 3, more or less united into a 3-celled ovary, or separate; styles free (except *Bunchosia*). Trees or shrubs. Leaves simple, opposite, with or without stipules. Fruit a drupe or a capsule.

Fam. 50. **Polygalaceæ.** Fls. 2-sexual, irregular. Sepals 5, imbricate, the 2 inner lateral larger, coloured, wing-like. Petals 3, united into a corolla: or 5 (2 reduced to scales). Stamens 8, united into a sheath. Ovary 1-2-celled. Herbs or shrubs. Leaves simple, usually alternate, without stipules. Fruit a capsule, winged in *Securidaca*.

Fam. 51. **Euphorbiaceæ.** *Fls. unisexual, monoecious or dioecious, regular or slightly irregular. Perianth often small, sometimes wanting, sometimes dissimilar in the male and female flowers, either a calyx only or calyx and corolla. Stamens 1 to indefinite. Ovary usually 3-celled. Trees, shrubs, or herbs, often with milky sap. Leaves simple, sometimes lobed, rarely with 3 or more digitate leaflets, or reduced to scales. Fruit usually capsular, splitting into 1- or 2-seeded segments, sometimes not splitting open, with outside fleshy.*

Fam. **Callitrichaceæ.** *Fls. unisexual, without perianth. Male flower, a single stamen; female, a 4-celled ovary with 2 styles. Small aquatic or terrestrial plants, with simple opposite leaves.*

KEY TO FAMILIES

[The figures refer to the number of the Family.]

A. Perianth wanting, or of a single series, the calyx.

- Flowers 2-sexual 39. *Crudia, Prioria.*
Flowers 1-sexual.
 Ovary usually 3-celled..... 51. *Euphorbiaceæ.*
 Ovary 4-celled..... *Callitrichaceæ.*

B. Perianth of a double series—sepals and petals.

- Flowers unisexual.
Leaves simple.
 Ovary of four carpels cohering only at the apex... 46. *Castela.*
 Ovary 2-3-celled..... 51. *Euphorbiaceæ.*
Leaves pinnate.
 Styles sublateral..... 45. *Zanthoxylum.*
 Styles terminal..... 46. *Simarubaceæ.*
Flowers polygamous.
 Carpel one. Fruit a pod (sometimes not opening) 39. *Leguminosæ.*
 Carpels more or less free, quite free in fruit.
 Styles sublateral..... 45. *Zanthoxylum.*
 Styles terminal..... 46. *Picræna.*
 Carpels united into a single ovary.
 Ovary 1-celled..... 45. *Amyris.*
 Ovary 3-5-celled.
 Trunk unbranched. Stamens as many as
 petals..... 45. *Spathelia.*
 Trunk branched. Stamens twice as many
 as petals 47. *Burseraceæ.*
Flowers 2-sexual.
Leaves simple or 1-foliate.
Leaves alternate.
 Fruit a pod (sometimes not opening, rarely
 drupe-like) 39. *Leguminosæ.*
 Fruit samaroid 50. *Securidaca.*
 Fruit a capsule.
 Flowers regular 42. *Linum.*
 Flowers irregular 50. *Polygala.*
 Fruit a drupe..... 43. *Erythroxylon.*
 Fruit baccate..... 45. *Rutaceæ.*
 Ripe carpels 3-5, surrounded by the calyx..... 46. *Suriana.*
Leaves opposite.
Leaves gland-dotted..... 45. *Ravenia.*
Leaves not glandular.
 Leaves palmately lobed..... 40. *Geranium.*
 Leaves entire, very rarely toothed..... 49. *Malpighiaceæ.*

- Leaves compound.
- Leaves alternate.
- Fruit a pod (sometimes not opening, rarely drupe-like)..... 39. *Leguminosæ*.
- Fruit not a pod.
- Leaves sensitive to light..... 41. *Oxalis*.
- Leaves not sensitive.
- Filaments free.
- Flowers 2-sexual.
- Shrubs or trees.
- Leaves gland-dotted 45. *Rutaceæ*.
- Leaves not glandular 47. *Protium*.
- Herbs..... 44. *Zygophyllaceæ*.
- Flowers 1-sexual 46. *Alvaradoa*.
- Filaments united more or less into a tube,
or adherent to the columnar disk..... 48. *Meliaceæ*.
- Leaves opposite.
- Leaves gland-dotted 45. *Rutaceæ*.
- Leaves not glandular 44. *Zygophyllaceæ*.
-

NOTE ON

DR. PATRICK BROWNE'S *Natural History of Jamaica*.

Dr. Patrick Browne published his "Natural History of Jamaica" in 1756, three years after the appearance of Linnaeus's "Species Plantarum." Browne did not adopt the binomial system of Linnaeus, but quoted as synonyms of his own diagnostic names the diagnoses of the "Species Plantarum." In his own copy of the History, now in the library of the Linnean Society, Linnaeus added the binomial as a marginal note.

Linnaeus acquired Browne's herbarium in 1758, and has underlined in his copy of the "History" the first letter of those species of which there was a specimen in Browne's herbarium. In some instances these specimens were the foundation of species published by Linnaeus in the "Systema," edit. 10, 1759, for instance, *Cassia viminea*; others represented species which Browne had failed to identify with those in the "Species Plantarum," for instance, *C. biflora*. Sometimes a specimen in Browne's herbarium has not been identified by Linnaeus with any diagnosis of Browne, but has been published in the "Systema," for instance, *C. pilosa*.

DICOTYLEDONS

FAMILY XXXIX. LEGUMINOSÆ.

TREES, shrubs, or herbs. Leaves alternate or rarely opposite, nearly always compound, sometimes simple, generally with stipules. Peduncles axillary or terminal, with one to numerous flowers. Flowers: irregular generally hermaphrodite, or regular generally polygamous. Sepals more or less united, generally 5 in the irregular flowers, the fifth lowest; 5 or 4 in the regular flowers. Petals as many as the sepals; in the irregular flowers the fifth highest. Stamens generally twice as many as the petals, sometimes as many, sometimes indefinite, few or numerous, usually inserted on the margin of the receptacle. Carpel solitary, 1-celled; ovules numerous, attached at the interior angle. Fruit a pod, sometimes splitting into one-seeded joints. Endosperm scanty or wanting. Cotyledons generally flat, foliaceous or thick and fleshy; radicle superior.

Species over 12,000 in number, found in every part of the world.

SUBFAMILY 1. PAPILIONATÆ.

Flowers papilionaceous. Petals imbricate, the uppermost outside. Stamens 9 or 10, united into a sheath, or distinct in §§ 11, 12—numerous in § 12. Leaves simple, digitate or pinnate,

KEY TO SECTIONS.

Leaves simple, or digitate with 1, 3, or 5 leaflets.

- | | |
|---|------------------------|
| Flowers racemose or solitary | § 1. |
| Flowers in heads. Pod enclosed in the withered calyx and corolla..... | § 2. |
| Flowers covered by large bracts | § 9. <i>Flemingia.</i> |
| Leaves digitate with 2 or 4 leaflets | § 4. <i>Zornia.</i> |
| Leaves reduced to spines | § 1. <i>Ulex.</i> |

Leaves pinnate with an odd leaflet.

Leaves with 1-3 leaflets.

Pod jointed § 4.

Pod not jointed.

Leaflets with conspicuous stipels § 8.

Leaflets generally without stipels.

Stamens numerous, all distinct. Petal 1 § 12.

Stamens 10 (or 9), only one sometimes distinct.

Leaflets with glandular dots beneath § 9.

Leaflets without glandular dots.

Trees or shrubs § 10. *Dalbergia*.

Herbs woody below § 3. *Indigofera*.

Leaves with 5 to several leaflets.

Pod jointed § 4. *Aeschynomene*.

Pod not jointed.

Stamens 10, all distinct. Shrubs or trees § 11.

Stamens 10 or 9, one only sometimes distinct.

Stems twining § 8. *Clitoria*.

Stems not twining.

Herbs or shrubs. Stamens 9 in one bundle,

one usually distinct § 3.

Trees or shrubs, branches sometimes

twining. Stamens in 1 or 2 bundles,

one sometimes more or less distinct § 10.

Leaves abruptly pinnate.

Leaves with 2 pairs of leaflets. Pod burying itself
in the earth § 5.

Leaves with several pairs of leaflets.

Leaves with a tendril § 6.

Leaves without tendrils.

Branches twining § 7.

Branches not twining § 3. *Sesbania*.

KEY TO GENERA.

§ 1. Herbs or shrubs (not twining). Leaves simple or digitate, with 3 or 5 leaflets, or reduced to spines. Flowers various. Pod 2-valved, inflated in *Crotalaria*.

Leaves simple, or digitate with 3 or 5 leaflets ... 1. *Crotalaria*.
[Leaves reduced to spines *Ulex*.]

§ 2. Herbs. Leaves digitately 3-foliolate, leaflets dentate. Flowers in heads. Pod small, enclosed in the withered calyx and corolla, not opening 2. *Trifolium*.

§ 3. Herbs (woody below) or shrubs, not twining, sometimes arborescent (in *Sesbania*). Leaves imparipinnate (usually 5 or more leaflets) or abruptly pinnate (in *Sesbania*). Flowers in racemes, axillary, terminal, or opposite the leaves. Pod 2-valved, or sometimes scarcely opening (in *Sesbania*). Racemes axillary.

Leaves imparipinnate 3. *Indigofera*.

Leaves abruptly pinnate 5. *Sesbania*.

Racemes terminal and also axillary, or opposite
the leaves 4. *Tephrosia*.

[Racemes appearing before the leaves *Gliricidia*.]

§ 4. Herbs, sometimes shrubby below, not climbing, or small trees. Leaves imparipinnate, leaflets 1-3, or numerous (in *Æschynomene*), or digitately 2-4-foliolate. Pod jointed; joints 1-seeded, usually separating.

- Leaves with numerous leaflets
- Leaves 1-3-foliolate with scarcely any common petiole; stipules spinescent. Small trees...
- Leaves 3-foliolate; leaflets without stipels.
Stipules united to the leaf-stalk
- Leaves digitate with 2 or 4 leaflets
- Leaves 3-foliolate; leaflets with stipels
- [Leaves with 1 large leaflet; petiole winged
- [Leaves with one 2-lobed leaflet
- [Leaves with 1 leaflet; calyx dry, stiff

[§ 5. Low-growing herbs. Leaves abruptly pinnate. Flowers 1 or more, crowded in the lower axils. Pod burying itself in the earth

- 7. *Æschynomene*.
- 6. *Brya*.
- 8. *Stylosanthes*.
- 9. *Zornia*.
- 10. *Desmodium*.
D. triquetrum.]
Lourea.]
Alysicarpus.]

[§ 6. Climbing herbs. Leaves abruptly pinnate ending in a tendril; leaflets without stipels. Stipules semisagittate. Flowers 1 or 2 together in the axils. Pod 2-valved.....

Arachis.]

§ 7. Shrubs with twining branches. Leaves abruptly pinnate, with the end of the petiole produced and bristle-like; leaflets without stipels. Flowers in clusters along axillary and terminal racemes. Pod 2-valved

11. *Abrus*.

§ 8. Herbs or shrubs, twining (rarely erect, or prostrate, or trees). Leaves pinnately 3-(5-7-)foliate; leaflets with stipels. Flowers in axillary racemes, usually 2 or more in clusters along the rhachis, the racemes sometimes reduced to one flower or a few clustered in the axils. Pod 2-valved.

Trees. Flowers red..... 15. *Erythrina*.

Herbs or shrubs.

Standard much larger than the other petals and flat.

Bracteoles longer than the calyx or nearly as long..... 12. *Centrosema*.

Bracteoles less than half as long as the calyx..... 13. *Clitoria*.

Standard shorter than the other petals..... 16. *Mucuna*.

Standard not much larger nor smaller than the other petals.

Keel forming a complete spiral..... 20. *Phascolus*.

Keel not forming a complete spiral.

Style hairy along the inner side above.

Stigma oblique or lateral..... 21. *Vigna*.

[Stigma subglobose on inner side of style. Root tuberous

Pachyrhizus.]

[Stigma small, terminal. Pod rough with warty projections along the margins.....

Dolichos.]

- Style without hairs.
- Calyx with 4 entire lobes.
- Pod narrow, linear..... 17. *Galactia*.
 - Pod broad; margins thickened, upper furrowed..... 18. *Dioclea*.
 - Calyx with 5 lobes, or 4 with one 2-toothed..... 14. *Teramnus*.
 - Calyx 2-lipped, upper large..... 19. *Canavalia*.
- § 9. Herbs or shrubs, erect or twining. Leaves pinnately 3-foliate or digitately 1-3-foliate; leaflets with glandular dots beneath, usually without stipels. Flowers in racemes. Pod 2-valved.
- Erect undershrubs or shrubs.
- [Pod marked with oblique depressed lines, 5-seeded] *Cajanus*.]
 - [Pod short, 2-1-seeded. Bracts large] *Flemingia*.]
 - Twining undershrubs..... 22. *Rhynchosia*.
- § 10. Trees, or shrubs with trailing or twining branches. Leaves imparipinnate with several leaflets, sometimes only 3 or 1; leaflets without stipels (except rarely in *Lonchocarpus* and *Andira*). Flowers in axillary panicles or racemes, panicles terminal or subterminal in *Andira*. Pod not opening, membranous, leathery, woody, or drupaceous.
- Leaflets alternate (or solitary).
- Leaflets 1 or 2-5. Pod with style terminal.... 23. *Dalbergia*.
 - Leaflets 5-9. Pod with style lateral..... 24. *Pterocarpus*.
- Leaflets opposite.
- Flowers in axillary racemes. Pod flat, without wings..... 25. *Lonchocarpus*.
 - Flowers in axillary panicles, appearing before the leaves. Pod with 4 wings..... 26. *Piscidia*.
 - Flowers in terminal panicles. Pod drupaceous 27. *Andira*.
- § 11. Shrubs or trees. Leaves imparipinnate; leaflets in 4-12 pairs, opposite or nearly opposite. Pod 2-valved or not splitting open.
- Shrub. Leaflets in 5-12 pairs. Pod constricted between the seeds, not opening, 5-9-seeded... 28. *Sophora*.
- Tree. Leaflets in 4-5 pairs. Pod 2-valved, 1-2-seeded..... 29. *Ormosia*.
- § 12. Trees. Leaves reduced to 1 leaflet. Calyx closed before flowering, afterwards bursting into 2-4 irregular segments. Petals one—the standard..... 30. *Swartzia*.

SUBFAMILY 2. *CÆSALPINIEÆ*.

Flowers irregular. Calyx imbricate (but subvalvate in *Poinciana* and *Parkinsonia*, spathaceous in *Bauhinia*). Petals imbricate, the uppermost inmost. Stamens usually distinct. Leaves pinnate or bipinnate, or composed of 2 leaflets united into a single 2-lobed leaf in *Bauhinia*.

- § 13. Leaves abruptly bipinnate (with an odd pinna in *Cæsalpinia coriaria*), or most leaves simply pinnate in *Hamatoxylum*. Calyx 5-cleft. Anthers versatile. Calyx-segments very imbricate.
- Tree. One segment of calyx larger, comb-like. Pod not opening, flat-compressed, thinning to the margin, as it were 2-winged..... 31. *Peltophorum*.
- Shrubs or small trees. Pod 2-valved or not splitting, not winged, margins blunt..... 32. *Cæsalpinia*.
- [Tree. Pod flat, thin, splitting open in the middle of the valves, not at the margin.... *Hamatoxylum*.]
- Calyx-segments valvate or slightly imbricate.
- [Leaves with 11-18 pairs of pinnae *Poinciana*.]
- [Common petiole of the leaves very short, spine-like, pinnae 2-4, very long, with minute distant leaflets..... *Parkinsonia*.]
- § 14. Leaves abruptly pinnate. Calyx 5-cleft, segments imbricate. Petals 5. Anthers basifix'd, opening by pores or chinks. Seeds with endosperm 33. *Cassia*.
- § 15. Leaves composed of two leaflets united. Calyx spathaceous, 5-toothed. Petals 5. Anthers versatile. Seeds with endosperm..... 34. *Bauhinia*.
- § 16. Leaves abruptly pinnate or imparipinnate (in *Crudia*); leaflets 2 to numerous. Sepals 4, imbricate. Petals 3, 5, or none. Anthers versatile.
- [Leaflets numerous. Petals 3. Stamens 3, united into a sheath..... *Tamarindus*.]
- Leaflets 2. Petals 5. Stamens 10..... 35. *Hymenaea*.
- Leaves imparipinnate. Petals none. Stamens 10 (9, 8)..... 36. *Crudia*.
- § 17. Leaves abruptly pinnate; leaflets in 1 or 2 pairs. Sepals 5, very imbricate. Petals none. Anthers versatile. Ovules 2.... 37. *Prioria*.

SUBFAMILY 3. MIMOSÆ.

Flowers regular, small. Calyx valvate. Petals valvate, generally united below the middle. Stamens distinct or united. Leaves bipinnate (pinnate in *Inga*).

- § 18. Parts of the flower in 5's. Stamens 10, distinct; anthers with a small gland, which drops off soon after the opening of the flower. Pollen granules numerous, distinct.
- Climbing shrub with tendrils. Pods very large 38. *Entada*.
- Trees or shrubs not climbing.
- Flowers in globular heads 39. *Piptadenia*.
- [Flowers in racemes *Adenanthera*.]
- [Flowers in spikes *Prosopis*.]
- Herbs prostrate or floating 40. *Neptunia*.

- § 19. Parts of the flower in 5's or 4's. Flowers in globular heads. Stamens as many as, or twice as many as, the petals; anthers without glands. Pollen granules numerous, distinct.
- Parts of the flower in 5's. Calyx campanulate.
- Gland between the lowest pair of pinnæ 41. *Desmanthus*.
- Gland in middle of petiole, or just below the pinnæ, or wanting 43. *Leucæna*.
- Parts of the flower in 4's. Calyx minute 42. *Mimosa*.
- § 20. Parts of the flower in 5's or 4's. Flowers in globular heads, or in spikes (in *A. suma*). Stamens indefinite, generally numerous, distinct or slightly united at the base. Pollen granules in 2-6 masses in each cell 44. *Acacia*.
- § 21. Parts of the flowers in 5's. Stamens indefinite, sometimes few, united at the base or into a tube. Anthers small. Pollen granules in 2-6 masses in each cell.
- Leaves bipinnate.
- Pod strap-shaped, straight or slightly curved; valves elastically revolute from the apex 45. *Calliandra*.
- Pod broadly oblong, straight, thin, continuous within, valves not opening elastically nor twisted 46. *Albizia*.
- Pod curved and twisted spirally, continuous within, splitting open 47. *Pithecellobium*.
- Pod straight or curved, continuous within, tardily opening 48. *Zygia*.
- Pod curved or straight, thick, not opening, with partitions between the seeds 49. *Enterolobium*.
- Leaves simply abruptly pinnate 50. *Inga*.

SUBFAMILY 1. *PAPILIONATÆ*

Flowers papilionaceous (that is, like a pea-flower). Sepals normally 5, united into a tubular or campanulate calyx. Petals 5, imbricate: the upper—the "standard," exterior; the 2 lateral—the "wings"; the 2 lower interior and generally parallel and united—the "keel." Stamens generally 10 (numerous in *Swartzia*); filaments united into a sheath enclosing the pistil, the uppermost often more or less free or sometimes wanting (all distinct in §§ 11 and 12); anthers all alike, or sometimes the alternate different. Radicle inflexed, accumbent on the cotyledons. Leaves digitately or pinnately compound, or sometimes simple.

- § 1. Herbs or shrubs (not twining). Leaves simple or digitately 3-5-foliolate, or reduced to spines. Flowers in racemes terminal or opposite the leaves, or solitary or shortly racemose in the axils. Stamens 10, all united into a sheath. Anthers alternately small, versatile, and long, basifixied. Pod 2-valved, inflated in *Crotalaria*.

1. CROTALARIA L.

Herbs or shrubs. Leaves simple or digitately 3–5-foliolate. Flowers yellow, but blue in *C. verrucosa*, in racemes terminal or opposite the leaves, axillary in *C. lotifolia*. Standard roundish; keel beaked. Staminal sheath split above. Rattle-wort.

Species about 450, widely dispersed through the warmer regions of the whole world.

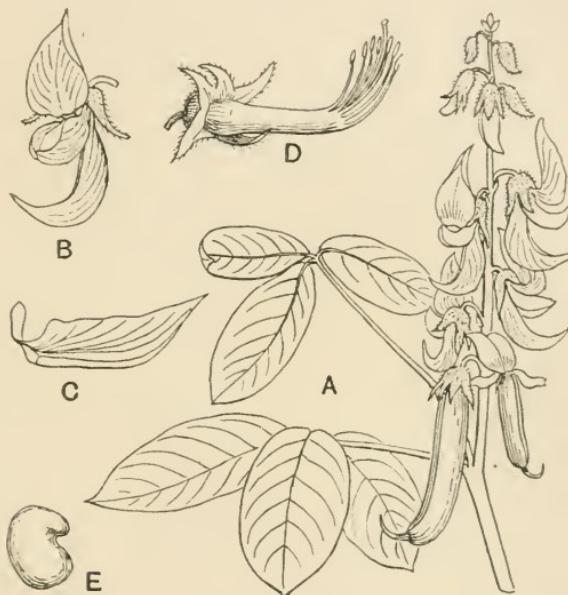


Fig. 1.—*Crotalaria striata* DC.

A, Raceme and leaves $\times \frac{1}{3}$.
B, Flower, nat. size.
C, Wing $\times 2$.

D, Flower with corolla removed $\times 2$.
E, Seed $\times 5$.
(Altered from Reichenbach.)

§ 1. Leaves simple.

Stipules (when present) not decurrent.
Erect herbs or shrubs.

Pods hairy.

Stipules foliaceous, lunate. Flowers blue ... 1. *C. verrucosa*.

Stipules minute or wanting.

[Leaves linear or oblong-linear, 4–10 cm. l. *C. juncea*.]

[Leaves lanceolate-linear, 10–30 cm. l. *C. tetragona*.]

[Leaves oblanceolate or lanceolate, 6–8 cm. l. *C. fulva*.]

Flowers paniculate.....

Pods glabrous.

Stipules very small or wanting. Bracts awl-shaped

[Stipules $\frac{1}{2}$ -sagittate. Bracts ovate, foliaceous

Diffuse herb, not more than 1 ft. high, with
small leaves and pods

2. *C. retusa*.

C. sericea.]

C. nana.]

- Stipules decurrent.
- Free apex of stipules acute 3. *C. sagittalis*.
- Free apex sometimes obtuse. 4. *C. pterocaula*.
- § 2. Leaves 3-foliolate.
- Peduncles 1- or few-flowered, axillary 5. *C. lotifolia*.
- Racemes 5- or many-flowered, opposite a leaf or terminal.
- Pod hairy.
- Pod 1-1·5 cm. l. 6. *C. pumila*.
- Pod 3 cm. l. 7. *C. incana*.
- Pod glabrous 8. *C. striata*.
- § 3. [Leaves 5-foliolate *C. quinquefolia*.]

§ 1. Leaves simple.

*Stipules when present, not decurrent.

1. *C. verrucosa* L. Sp. Pl. 715 (1753); leaves ovate or roundish-elliptical; stipules foliaceous; flowers blue; pods pubescent with adpressed down. Bot. Mag. t. 3034; Macf. Jam. i. 238; Griseb. Fl. Br. W. Ind. 178; Bak. in Hook. f. Fl. Br. Ind. ii. 77. Type in Herb. Hermann in Herb. Mus. Brit.

Fls. throughout the year; common, Macfadyen! Liguanea, McNab! Lane! J.P. 962, Morris! Miss Foster! near Kingston, 500 ft., Clute! also Rothrock; Billy Dun, 500 ft., Campbell! Long Mt. road, Fawcett! Watson's Hill, Manchester, 800 ft.; near Troy, 2000 ft.; Harris! Fl. Jam. 5833, 6381, 8814. Port Royal, Lucea, Hitchcock.—Tropics.

Annual, scarcely shrubby, 2-3 ft. high, puberulous, glabrescent, branches and peduncles 4-3-angled. Leaves 7-3 cm. l., 5-2 cm. br.; stipules lunate, deflexed. Racemes many-flowered. Calyx 2-lipped, half as long as the corolla, 7-10 mm. l., glabrescent; segments narrowly triangular, acuminate. Pod oblong, 3-3·5 cm. l., brown.

This species and others have been used as green dressings.

[*C. juncea* L. Sp. Pl. 714 (1753); leaves linear or oblong-linear, 4-10 cm. l.; stipules minute, setaceous, or wanting; pods pubescent-tomentose.—Bot. Mag. t. 490; Bak. tom. cit. 79; Griseb. op. cit. 179; Wils. in Reports Geolog. Jam. 276; Watt Dict. Econ. Prod. Ind. ii. 595. Type in Herb. Linn.

Fls. in autumn; Barbican, Liguanea Plain, McNab! Wilson; March! near Camp, 280 ft., Campbell! King's House grounds; Halfway Tree; Harris! Fl. Jam. 6111, 6905, 8274, 11,856; Constant Spring, Hitchcock.—Tropics of the Old World.

Annual, shrubby, to 10 ft. high, branching, silky-puberulous. Leaves silky-pubescent chiefly beneath, about 5 cm. br. Racemes long, with many flowers. Calyx 5-partite, nearly as long as the corolla, about 1·5 cm. l., segments lanceolate-linear. Pod oblong, about 3 cm. l.

The plant yields the Sunn or San hemp of commerce, and is cultivated for this purpose in the tropics of the Old World. It is used in the manufacture of ropes, fishing nets, saddles for pack horses, hose pipes, etc. It has considerable tensile strength, and, like European hemp, its tendency to rot under water seems to be very slight.]

[*C. tetragona* Roxb. *Fl. Ind.* iii. 263 (1832); leaves long, lanceolate-linear, acuminate, 1–3 dm. l.; stipules minute, setaceous, or wanting; pods tomentose-pubescent.—*Griseb. op. cit.* 179; *Wils. loc. cit.*; *Bak. tom. cit.* 78.]

Wilson; St. Andrews, *Prior*; Gordon Town, *Roberts!* Silver Hill, *Harris!* Fl. Jam. 5597.—India to Java.

Shrub, to 6 ft. high, branches acutely tetragonal, when young pubescent. Leaves strigose-pubescent on both sides or glabrescent. Racemes laxly 6–10-flowered, 1–5 dm. l. or more. Bracts minute, linear. Flowers lemon-yellow. Calyx 2-lipped, segments very long, linear-lanceolate, densely brown-velvety, 2 cm. l. or more. Corolla somewhat longer than the calyx. Pod oblong, dark brown, 3·5–5 cm. l.]

[*C. fulva* Roxb. *Fl. Ind.* iii. 266 (1832); leaves oblong-lanceolate to oblanceolate (rarely elliptical), 6–8·5 cm. l.; stipules wanting, or minute, setaceous; flowers paniculate; pods thinly silvery, enclosed within the calyx.—*Griseb. op. cit.* 179; *Wils. loc. cit.*; *Bak. tom. cit.* 80.]

Bancroft! St. Mary, *McNab!* *Wilson!* Shortwood, 500 ft., *Campbell!* Hope Mines, 800 ft.; Hope River course, 600–700 ft.; *Harris!* Fl. Jam. 6243, 6825, 6943, 9037.—E. Indies to Sumatra, naturalized in Seychelles and Mauritius.

Shrub 3–8 ft. high; branches cylindrical, densely clothed with short brown silvery hairs. Leaves closely silvery, 2–3 cm. br. Racemes compound, in a terminal panicle. Bracts and bracteoles elliptical, cuspidate. Flowers fragrant. Calyx 5-partite, sericeous on the outside, 1·1–3 cm. l.; segments ovate, blunt. Pod globose-ellipsoidal, 2-seeded.]

2. *C. retusa* L. *Sp. Pl.* 715 (1753); leaves oblanceolate to oblanceolate-oblong, apex retuse or rounded; stipules very small, awl-shaped or wanting; bracts awl-shaped; pods glabrous.—*Bot. Mag. t.* 2561; *Macf. Jam. i.* 239; *Griseb. op. cit.* 179; *Wils. loc. cit.*; *Bak. tom. cit.* 75; *Urb. Symb. Ant. iv.* 281. Type in *Herb. Mus. Brit.*

Fls. in autumn; common; *Macfadyen*; *Distin!* St. Mary, *McNab!* *Wilson!* J.P. 615, 963, *Morris!* King's House grounds, *Campbell!* Buff Bay; Annotto Bay; *Thompson!* Hope grounds, *Harris!* St. George, Watt! *Miss Foster!* Gordon Town, *Ball!* Kingston, *Clute!* also *Hitchcock*; Port Antonio, *Millspaugh*. Fl. Jam. 5709, 6474, 6784, 7918, 8487.—Tropical and subtropical regions.

Annual, shrubby, 1–3 ft. high, silvery-puberulous or glabrate. Leaves glabrous on upper surface, tomentellous beneath, pellucid-dotted, 3–8 cm. l. (and more), 1·2–2·5 (3·5) cm. br. Racemes many-flowered, long. Flowers showy. Calyx 2-lipped, about half as long as the corolla, 1·1–1·5 cm. l., sparingly puberulous; segments triangular-lanceolate. Standard with purple lines inside, somewhat brownish outside, to 2 cm. l. Pod oblong, blackish, 3–4 cm. l.

[*C. sericea* Retz. *Obs. v.* 26 (1789) (non *Burm. f.*); leaves oblanceolate-oblong, mucronulate; stipules semi-sagittate, sessile, reflexed, persistent; bracts ovate, foliaceous, persistent; pod

glabrous.—*Griseb. loc. cit.*; *Wils. loc. cit.*; *Bak. loc. cit.* C. Retzii *Hitchc. in Rep. Miss. Bot. Gard. iv.* 74 (1893).

Negro River, Purdie! Wilson! Waters! Lucea, Hitchcock.—India, Pegu, Malacca.

Shrubby, 2-3 ft. high, glabrate. Leaves pubescent with adpressed hairs beneath, 7-15 cm. l., 2·5-4 cm. br. Racemes long, many-flowered. Calyx 2-lipped, shorter than the corolla, 1·5 cm. l., glabrous; segments triangular, acuminate. Pod oblong, 3-5 cm. l.]

C. sericea Burm. f. Fl. Ind. 156 (1768) is a different species and has been doubtfully referred to *C. assamica* Benth.

[*C. nana* Burm. f. Fl. Ind. 156, t. 48, f. 2 (1768); annual, 1 ft. or less high, with many slender spreading or ascending branches clothed with short silky hairs; leaves oblong-linear, 1-2 cm. l.; stipules wanting; pods glabrous, about 7 mm. l.—*Griseb. op. cit.* 179; *Wils. loc. cit.*; *Bak. tom. cit.* 71.

Wilson; Fairfield, Manchester, Wullschaegel.—India, Burma, Ceylon.

Leaves mucronulate, with silky pubescent adpressed hairs chiefly beneath, 4-6 mm. br. Racemes few-flowered. Calyx 2-lipped, with long silky hairs, about 5 cm. l. Pod ellipsoidal, black.]

**Stipules decurrent.

3. *C. sagittalis* L. Sp. Pl. 714 (1753) (in part); stipules all acute.—*Urb. Symb. Ant.* iv. 280. *C. frutescens* hirsuta, flore luteo, ramulis alatis, foliis mucronatis *Houst. MS.* 101, f. 139. *C. fruticosa* Macf. *Jam. i.* 240 (1837).

Houstoun! Macfadyen; Job's Hill, St. Mary, *McNab!* Newcastle, J.P. 1434, *Hart!* Pen Hill, 2500 ft.; Tweedside, south St. Andrew, 2500 ft.; Salt Hill, St. Andrew, 3800 ft.; bed of river, Castleton, 490 ft.; *Harris!* Golden Spring, 800 ft., *Thompson!* Fl. Jam. 5804, 6928, 8085, 11,855, 11,965.—Hispaniola, Porto Rico, continental America from New England to Peru.

Somewhat shrubby, generally about 1 ft. high, more or less villose with whitish or yellowish hairs, mostly adpressed. Leaves linear, linear-oblong, or linear-lanceolate above, oblong below, sparsely hairy on upper surface, hairy on margin and on midrib beneath, 2·5-6 (1·5-7) cm. l.; stipules well developed on stem and upper parts of branches, wanting below or represented by linear bracts, free portion lanceolate, acute. Racemes few-flowered. Bracts linear, 5-8 mm. l.; bracteoles linear, 4-7 mm. l. Flowers tawny-yellow (rarely white). Calyx 7-13 mm. l. Standard and wings about half as long as the calyx; keel a little longer than the standard. Pod oblong, black, glabrous, 2-3 cm. l.

Var. *fruticosa* var. *nov.*; 2-4 ft. high; leaves linear-lanceolate, greyish-pulverulent especially beneath, 3-7 cm. l.—*C. fruticosa* Mill. *Gard. Dict. ed. 8* (1768).

Houstoun, seeds sent from Jamaica and grown in Chelsea Physic Garden by Miller, specimens in Herb. Mus. Brit.! Devon Pen, near Castleton, 300 ft. *Thompson!* Fl. Jam. 7973.

4. *C. pterocaula* Desv. *Journ. Bot.* iii. 76 (1814); stipules mostly obtuse.—*Benth. in Fl. Bras.* xv. pt. 1, 19, t. 2; *Griseb. op. cit.* 178 (excl. syn.).

“Hollis’s savanna, St. Ann & Clarendon,” *Purdie!*—Trinidad, Panama, tropical South America.

Shrubby, 2 ft. high, the whole plant covered with brownish-yellow appressed hairs. Leaves linear-lanceolate, densely hairy on both sides, 2–4(–8) cm. l.; stipules variable, some at least obtuse, others toothlike or lanceolate. Racemes few-flowered. Bracts lanceolate, 5 mm. l.; bracteoles lanceolate, 3·5–4 mm. l. Calyx 11–12 mm. l. Standard 8–9 mm. l.; wings shorter than standard; keel a little longer. Pod 3–4 cm. l.

§ 2. Leaves 3-foliate.

5. *C. lotifolia* L. *Sp. Pl.* 715 (1753) (by error *latifolia*); leaflets narrowly elliptical; peduncles 1- or few-flowered, axillary, short; calyx about 8 mm. l., exceeded by the corolla; pods puberulous.—*Macf. Jam.* i. 240; *Griseb. op. cit.* 180; *Urb. Symb. Ant.* iv. 281. *C. trifolia fruticosa* foliis glabris &c. *Sloane Cat.* 141 & *Hist.* ii. 33. *C. loti folio* &c. *Dill. Elth.* 121, t. 102, f. 121. Type in *Herb. Mus. Brit.*

Between the Town Savanna and Two Mile Wood, *Sloane Herb.* vi. 5! *Shakspear!* *Masson!* *Macfadyen!* Great Valley, Manchester, *Purdie!* Great Goat Is., *Harris!* *Fl. Jam.* 9823.—Cuba, Hispaniola, Porto Rico, St. Thomas, St. Cruz.

Shrubby, to 6 ft. high; branches tomentellous. Leaflets 5 cm. l., petioles and under surface silky pubescent; stipules minute. Calyx 5-partite, pubescent. Pod ovoid-oblong, apex truncate, about 2 cm. l.

6. *C. pumila* Orteg. *Hort. Matr.* 23 (1800); leaflets oblanceolate or narrowly oblanceolate-oblong, 1–2·5 cm. l.; calyx 3 mm. l., corolla twice as long; pod puberulous, 1–1·5 cm. l.—*Griseb. op. cit.* 179; *Hemsl. Biol. Centr. Amer. Bot.* i. 227. *C. lupulina* H. B. & K. *Nor. Gen. & Sp.* vi. 402, t. 590 (1824). *C. litoralis* H. B. & K. *tom. cit.* 401 (1824).

St. Ann, *McNab!* *March!* St. Ann’s Bay, *Prior!* also *Harris!* *Fl. Jam.* 10,368.—Florida and Keys, Bahamas, Cuba, St. Kitts, Antigua, St. Vincent, Arizona, New Mexico, Texas, Mexico, Venezuela.

Perennial, to 3 ft.; branches diffuse or decumbent, pubescent or glabrate. Leaflets puberulous beneath; stipules setaceous, deciduous. Racemes about 9- or 10-flowered, or corymbiform 2–3-flowered. Calyx 5-partite, puberulous or glabrescent. Pod oblong.

7. *C. incana* L. *Sp. Pl.* 716 (1753); leaflets broadly elliptical or obovate; racemes 5-many-flowered; calyx 7–10 mm. l., exceeded by the corolla; pods pilose with spreading hairs.—*Macf. Jam.* i. 242; *Griseb. op. cit.* 180; *Urb. tom. cit.* 281. *C. trifolia fruticosa* foliis rotundis &c. *Sloane Cat.* 141 & *Hist.* ii. 34, t. 179, f. 1. Specimens in *Herb. Mus. Brit.* from *Hort. Cliff.* & *Sloane.*

Common, *Sloane Herb.* vi. 6! *Barham* and *Lane* in *Herb. Sloane* clxii, 76! *Wright!* *Liguanea*, *Broughton!* *Macfadyen!* *Distin!* St. Mary, *McNab!*

March! Prior! J.P. 875 *Morris!* Arcadia, *Mrs. Sewell!* Chester Vale, *Harris!* Barbican, Liguanea plain, 450 ft., *Campbell!* Providence, 700 ft., *Thompson!* Fl. Jam. 5930, 8055A; Bog Walk, Port Morant, Lucea, *Hitchcock*; *Porus, Lloyd.*—Tropical and subtropical regions.

Annual, 2-4 ft. high, shrubby, erect, pubescent. *Leaflets* pubescent beneath or glabrescent, 2-3.5(5) cm. l.; stipules setaceous, deciduous. *Flowers* greenish-yellow, 10-12 mm. l. *Calyx* 5-cleft, pubescent. *Pod* oblong, pendulous, about 3 cm. l.

S. C. striata DC. *Prodr. ii.* 131 (1825); leaflets elliptical, 3-9.5(-12) cm. l.; calyx-segments lanceolate, 4-4.5 mm. l., corolla more than twice as long as the calyx; pod glabrous, about 4 cm. l.—*Bot. Mag. t.* 3200; *Macf. Jam. i.* 241; *Griseb. ap. cit.* 180; *Bak. tom. cit.* 84. ?*C. mucronata Desv. Journ. Bot.* 1814, 76. *C. Brownei Bert. ex DC. Prodr. ii.* 130 (1825); *Reichenb. Ic. Exot. t.* 232. *C. Hookeri Aru. in Ann. Sc. Nat. sér. 2, iii.* 248 (1835). *C. striata* var. *acutifolia Trim. Cat. Ceyl. Pl. 22* (1885). (Fig. 1.)

Common; in fl. Oct.-Dec.; *Macfadyen*; St. Mary, *McNab!* St. George's Gap, *Purdie!* *Parnell!* *Wullschaegel*; *March!* *Prior*; Gordon Town, *Ball!* Hope River, 1200 ft., *Eggers!* Cinchona, 5000 ft., J.P. 1174, *Morris!* *Johnson!* Castleton road, 600 ft., *Thompson!* Fl. Jam. 8093, Blue Mt. Peak; Lucea; *Hitchcock*.—Tropics.

Shrubby, to 4 ft. high, erect, puberulous. *Leaflets*, apex mucronulate, acute, rounded or retuse, cuneate at base, puberulous or glabrate beneath; stipules wanting. *Racemes* sometimes as long as 3 dm., many-flowered. *Flowers* about 1.5 cm. l. *Calyx* 5-fid, 2-lipped. *Corolla*: standard 1 cm. l.; wings oblong, acute (or obtuse), blade about 1 cm. l.; keel 1.5 cm. l., with a rounded knee in the middle. *Pod* cylindrical.

§ 3. Leaves 5-foliolate.

[*C. quinquefolia L. Sp. Pl.* 716 (1753).—*Griseb. loc. cit.*; *Wils. loc. cit.*; *Bak. tom. cit.* 84.

Wilson!—East Indies to Philippines.

Annual, 2 ft. high, erect, puberulous or glabrescent. *Leaflets* 5, linear-lanceolate, puberulous beneath, 2-7 cm. l.; stipules minute, awl-shaped. *Racemes* many-flowered. *Bracts* linear-lanceolate, reflexed. *Calyx* 5-fid, glabrous, half the length of the corolla. *Pod* oblong-ellipsoidal, glabrous, about 5 cm. l.]

[ULEX L.

Shrubs with spiny branches. Leaves 3-foliolate in seedling plants, in mature plants spinescent without leaflets or reduced to small scales. Stipules none. Flowers yellow, axillary at the ends of the branches. Calyx coloured, 2-partite, 5-toothed. Staminal sheath closed.

About 20 species in the west of Europe and 2 in the Mediterranean region.

U. europaeus L. Sp. Pl. 741 (1753); *Macf. Jam. i.* 242; *Griseb. Fl. Br. W. Ind.* 180. Type in Herb. Linn.

Furze, Gorse, Whin.

Naturalized in the Blue Mts.; *Macfadyen*; *Morris!* Catherine's Peak, 4000 ft., *Eggers!*—This species is found not only in western Europe, where it is considered truly native, but also in N. America, Mexico, Chili, Canary Is., Nilgiri Mts., India, Philippines, Australia and New Zealand, in which countries it is looked upon as an introduction.]

§ 2. Herbs. Leaves digitately 3-foliolate, leaflets denticulate.

Flowers in heads axillary. Stamens 10, uppermost usually free, the rest united into a sheath. Pod small, enclosed in the withered calyx and corolla, not opening.

2. TRIFOLIUM L.

Species 300, numerous in temperate and subtropical regions of the northern hemisphere, a few in the mountains of tropical America, in temperate S. America, and in Africa.

Flowers white in large heads..... *T. repens*.

[Flowers yellow in small heads..... *T. dubium*.]

T. repens L. *Sp. Pl.* 767 (1753); stem creeping; flowers white (sometimes pinkish) in large heads.—*Macf. Jam. i.* 243; *Griseb. Fl. Br. W. Ind.* 181. (Fig. 2.) Type in Herb. Linn.

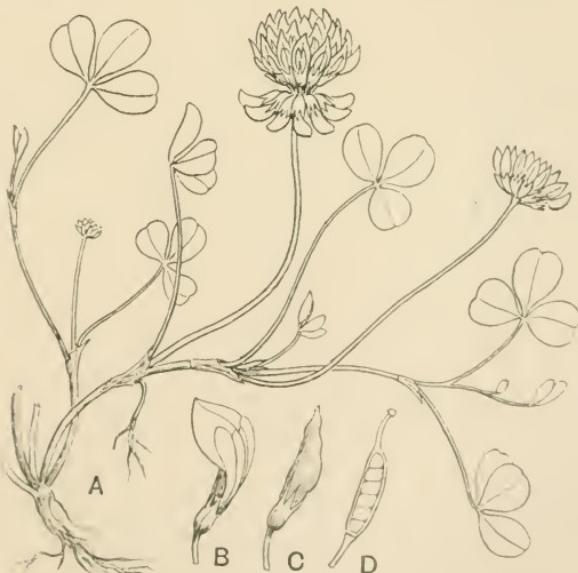


Fig. 2.—*Trifolium repens* L.

A, Portion of plant $\times \frac{1}{2}$.
B, Flower $\times 2$.

C, Pod enveloped in the persistent calyx
and corolla $\times 2$.
D, Pod with one valve removed $\times 2$.

Dutch or White Clover.

Common in mountains, *Macfadyen*; Cold Spring, J.P. 1223, *Morris!* Blue Mt. Peak, *Hitchcock*.—Continental America, Europe, Asia.

Perennial, glabrous. Leaflets roundish-obovate, 1-1.5 cm. l. Peduncle

longer than the leaves. Flowers shortly stalked, at length deflexed. Calyx glabrous, half as long as the corolla, with lanceolate creet unequal teeth. Pod 4-6-seeded.

[*T. dubium* *Sibth. Fl. Oxon.* 231 (1794); stem prostrate; flowers yellow in small heads.—*T. filiforme* *Macf. loc. cit.* (non *L.*); *Griseb. loc. cit.* *T. minus* *Relhan Fl. Cantab. ed.* 2, 290 (1802).]

Shamrock.

Common in the mts., *Macfadyen*; *McNab!* *Wilson*; *Morris!* *Mrs. Espeut!* Blue Mt. Peak, *Hitchcock*.—N. America, naturalized from Europe.

Annual, stem slender. Leaflets obovate, emarginate, serrulate, the middle leaflet stalked, 4-7 mm. l. Flowers yellow, about 12 in close heads. Standard truncate, covering the pod.]

§ 3. Herbs (woody below) or shrubs, not twining, sometimes arborescent (in *Sesbania*). Leaves imparipinnate or abruptly pinnate (in *Sesbania*), petiole not bearing a tendril, leaflets entire. Flowers in racemes, axillary, terminal, or opposite the leaves. Stamens 10, the uppermost free, or more or less free, the rest united into a sheath, split above. Pod 2-valved, or sometimes scarcely opening (in *Sesbania*).

3. INDIGOFERA L.

Shrubby herbs or shrubs; hairs often attached by the middle. Leaves imparipinnate (in Jamaican species), sometimes with 1 or 2 leaflets only in *I. lespedezoides*. Flowers in racemes, axillary (in Jamaican species), variegated-purplish. Calyx 5-cleft. Standard roundish, often persistent; keel usually with a spur on each side. Uppermost stamen free, the rest united into a slender persistent sheath; anthers apiculate. Pod narrow, cylindrical, 4-angled or flat-compressed, with partitions between the seeds.

Species 350, dispersed through the warmer regions of the world, most numerous in southern and tropical Africa.

Pod straight or only slightly curved, with 8-15 seeds.

- Leaflets in 4-6 pairs, oblong-obovate to roundish-obovate. Racemes shorter than the leaf 1. *I. tinctoria*.
- Leaflets in 2-3 pairs, elliptical. Racemes longer than the leaf 3. *I. subulata*.
- Leaflets 1 or 2 or in 1-4 pairs, cuneate-oblong. Racemes as long as or longer than the leaf 4. *I. lespedezoides*.
- Pod sickle-shaped, with 3-6 seeds 2. *I. suffruticosa*.

1. *I. tinctoria* *L. Sp. Pl.* 751 (1753); leaflets in 4-6 pairs, oblong-obovate to roundish-obovate, apex rounded, mucronulate, glabrous on the upper surface, strigillose beneath; racemes shorter than the leaf; pods slightly curved or straight, with 8-12 seeds.—*Wright Mem.* 293 (? *I. suffruticosa*); *DC. Prodr. ii.* 224 (excl. β); *Macf. Jam. i.* 245; *Bentl. & Trim. Med. Pl. t.* 72;

Prain and Bak. f. in *Journ. Bot.* xl. 63. *Coluteæ affinis fruticosa*, floribus spicatis purpurascensibus, siliquis incurvis, e cuius tinctura Indigo conficitur *Sloane Cat.* 141 & *Hist. ii.* 34, t. 179, f. 2 (pod thicker than specimen) & 176, f. 3. *Indigofera decomposita* &c. *Browne Hist. Jam.* 302. Type in Herb. Hermann in Herb. Mus. Brit.

Indigo.

Sloane Herb. vi. 7 (omitting ripe pods) & 8 (2 specimens)! *Broughton!* *Macfadyen!* *McNab!* *Lane!* *March!* *Prior*; *Gordon Town, Ball!* near *Kingston*, 500 ft., *Clute!* also *Hitchcock*; *Lime Cay*; *Norbrook*, 600 ft.; *Campbell!* *Alligator Pond*; *Hope*; *Harris!* Fl. *Jam.* 5737, 6265, 8215, 8229.—Cultivated formerly throughout the tropics.

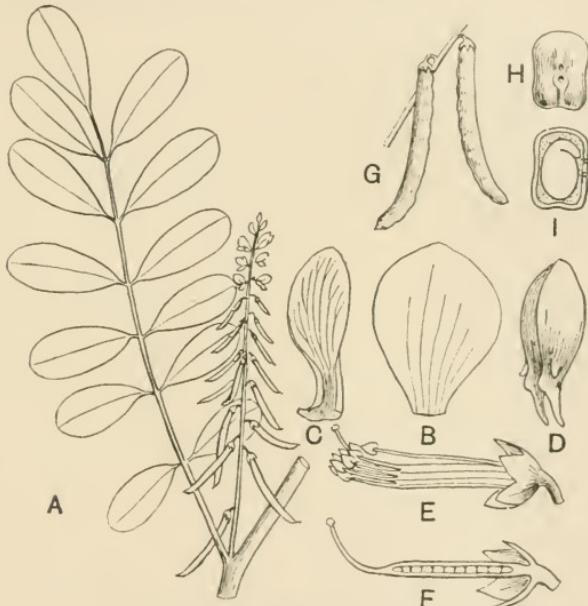


Fig. 3.—*Indigofera tinctoria* L.

A, Raceme and leaf $\times \frac{2}{3}$.

B, Standard $\times 6$.

C, Wing $\times 6$.

D, Keel $\times 6$.

E, Flower with corolla removed $\times 7$.

F, Ovary and calyx cut lengthwise $\times 7$.

G, Ripe pods $\times \frac{2}{3}$.

H, Ripe seed $\times 3$.

I, Ditto cut lengthwise $\times 3$.

Shrub, about 2 ft. high; ends of branches white-strigillose. Leaflets 1–2 cm. l.; stipules small, awl-shaped, deciduous. Calyx 5-fid, segments triangular. Corolla: standard broadly elliptical, vermillion-tinged inside, 5–6 mm. l., 3·5 mm. br.; wings oblong-spathulate, shorter than the keel, about 4·5 mm. l.; keel oblanceolate, greenish, ciliolate at the apex, about as long as the standard. Pod linear-cylindrical, slightly torulose, thickened along both margins, reflexed, strigillose, 2·5–3·5 cm. l. Seeds cylindrical, terete or angled, about 2 mm. l., without any depression at the scar of attachment.

There are three pages (viz. 7, 8, 9) with specimens of *Indigofera* in Herb. Sloane vi. The specimens on page 7 have the slightly curved many-sided pod of *I. tinctoria* L., but some ripe pods of *I. suffruticosa* Mill. have also been inserted. The plate 179, f. 2, is taken from one of these

specimens, but the pods have been drawn much thicker than they are in the original, and apparently gave rise to De Candolle's varietal name *macrocarpa*. The specimen on page 9 with few-seeded, sickle-shaped pods is *I. suffruticosa* Mill. There are three specimens on page 8. That on the left is the original of the plate 176, f. 3, and it and the specimen at the bottom of the page, though without pods, appear to be conspecific with the specimens on page 7, i.e. *I. tinctoria* L. The specimen on the right of the page agrees quite well with that on page 9, and is *I. suffruticosa* Mill. The specimen of *I. tinctoria* in Linnaeus's Herbarium agrees well with Sloane's specimens.

The label attached to page 7 is the diagnosis of Hist. ii. 34; that of page 8 is the diagnosis of Hist. ii. 37. It is quite clear from the diagnoses that they refer respectively to *I. tinctoria* L. and *I. suffruticosa* Mill., and it is unfortunate that there has been a mixing of the specimens, and that the artist copied the wrong specimen for t. 176, f. 3, with which the description in the text does not correspond.

2. *I. suffruticosa* Miller Gard. Dict. ed. 8 (1768); leaflets in 5–6 pairs, oblong, narrowing equally to both ends, generally acute, mucronulate, strigose on both sides, especially beneath; racemes shorter than the leaf with crowded flowers; pods sickle-shaped, with 3–6 seeds.—*I. anil* L. Mant. 272 (1771); Macf. Jam. i. 244; Prain and Bak. f. tom. cit. 137. *I. Guatimala* Lun. Hort. Jam. i. 420 (1814). *I. tinctoria* Wright Mem. 293 (1828) (non L.). *I. anil* L. var. *polyphylla* DC. Prodr. ii. 225 (1825). *Coluteæ affinis fruticosa argentea*, floribus spicatis e viridi purpureis, siliquis falcatis Sloane Cat. 142 & Hist. ii. 37 (omit t. 176, f. 3). *Indigofera assurgens subvillosa* &c. & *I. assurgens minusque* &c. Browne Hist. Jam. 302. Specimens from Herb. Miller in Herb. Mus. Brit. The specimen of *I. anil* in the Linnean Herbarium agrees well with Miller's specimen of *I. suffruticosa* and with Sloane's specimens.

Wild Indigo, Guatimala Indigo.

Barham in Herb. Sloane clxxxiv. 8! *Sloane* Herb. vi. 8 & 9! (omitting left and bottom specimens on 8); *Lane* in Herb. Sloane clxii. 82! *Wright*! *Macfadyen*! *Liguanea*; *Hopewell*, St. Mary; *McNab*! *Purdie*! *March*! *Resource*, Blue Mts., 3400 ft., J.P. 1252, *Hart*! *Gordon Town*, *Ball*! *Mavis Bank*, *Johnson*! *Kingston*, *Hitchcock*; *Poros*, *Lloyd*.—Bermuda, Bahamas, West Indies, tropical continental America, also Africa and Asia (where possibly it has been introduced).

Shrub; stem and branches densely white-strigillose. *Leaflets* 2–3 cm. l., stipules awl-shaped. *Calyx* 5-fid, segments subequal, triangular, 1·3 mm. l. *Corolla*: standard broadly elliptical, 4·5 mm. l.; wings oblanceolate, nearly as long as the keel; keel oblanceolate, nearly as long as the standard, with a spur on each side near the middle. *Pod* oblong-linear, slightly torulose, much thickened along both margins, reflexed, short, strigillose, 1·1–1·5 cm. l. *Seeds* cylindrical, terete, about 2·2 mm. l., with depression at the scar of attachment.

Form obtusifolia; leaflets elliptical or narrowly elliptical, generally obtuse or subobtuse, glabrous or sparingly strigose on upper surface, strigose beneath.

Resource, Blue Mts., 3400 ft., *Harris*! Yallahs Valley; Golden Spring, 800 ft., *Thompson*! Fl. Jam. 6142, 7987.

3. *I. subulata* Poir. *Encyc. Suppl.* iii. 150 (1813); leaflets in 2–3(–1) pairs, elliptical, apex rounded or obtuse, strigose on both sides; racemes longer than the leaf with long peduncle; pods straight or only slightly curved, with 10–15 seeds.—*DC. Prodr.* ii. 223; *Bak. in Hook. f. Fl. Br. Ind.* ii. 96; *Griseb. loc. cit.* *I. mucronata* *Spreng. ex DC. tom. cit. 227*; *Macf. Jam.* i. 245.

Broughton! common, Port Royal and St. Andrews Mts., *Macfadyen!* Yallahs River, *Purdie!* March; Agualta Vale, *Metcalfe!* Kingston, *Prior!* also *Clute!* Gordon Town, *Ball!* Guava Ridge, 2000 ft., *Eggers!* Hope, *Harris!* Golden Spring, 800 ft., *Thompson!* Constant Spring; Port Morant; *Hitchcock!* Porus, *Lloyd!* Fl. Jam. 6852, 8066.—Tropical and subtropical regions.

Shrubby, stem and branches white-strigose. Leaflets 2–4 cm. l., 1–1·8 cm. br.; stipules long, filiform, acuminate, about 6 mm. l. Racemes 1–1·5 dm. l., sometimes to nearly 3 dm. l. Calyx 5-partite, 2·5–3 mm. l.; segments lanceolate, acuminate, subequal. Corolla: standard roundish-rhomboidal, vermillion-coloured on the inside, pale outside with a green nerve, 4·5 mm. l., 4 mm. br.; wings oblong, apex broader, rounded, ciliolate at apex, as long as the standard; keel as long as the standard, white, upper edge tinged with red, and ciliate. Pod linear-cylindrical, not torulose, thickened especially along the dorsal margin, reflexed, strigillose, 2·5–4·5 cm. l. Seeds 2 mm. l., linear, 4-angled, with a depression at scar of attachment.

4. *I. lespedezoides* H. B. & K. *Nov. Gen. & Sp.* vi. 457 (1824); leaflets variable in size and number, 1 or 2, or with simple leaves only below and 1 to 4 pairs above, oblong and slightly tapering to the base, apex obtuse, mucronulate or emarginate-retuse, strigose on both sides; racemes about as long as the leaf or longer, with several flowers; pod straight, with about 10 seeds.—*DC. tom. cit. 226*; *Benth. in Fl. Bras.* xv. pt. 1, 39 t. 5.

Liguanea Ridge, St. Andrew, 1000 ft.; on land recently burnt over, Litz Savanna, 300–900 ft.; *Harris!* Fl. Jam. 11,745, 12,204.—Tropical S. America.

Shrubby, 2–3 ft. high; young branches slightly angled, slightly strigillose or glabrate. Leaflets, 3–1 cm. l., 7–5(–2) mm. br.; stipules lanceolate-setaceous, about 2·5 mm. l. Calyx 5-fid, tube about 1 mm. l.; segments triangular-acuminate, 1·3 mm. l. Corolla reddish, standard roundish, reflexed, about 5 mm. l.; wings obliquely lanceolate, a little shorter than the keel; keel about as long as the standard, with spurs about the middle. Pod linear-cylindrical, not torulose, slightly thickened along each margin, reflexed, strigillose or glabrescent, 2·5–3 cm. l.

Various species of *Indigofera* have been successfully used as cover crops, protecting the soil from wash on sloping ground.

Macfadyen states (*Flor. Jam.* i. 244) that *I. argentea* L. "was formerly a common weed in the Botanic Garden at Bath." We have not seen specimens from Jamaica.

4. TEPHROSIA Pers.

Shrubby herbs or shrubs. Leaflets numerous, with parallel oblique nerves, underneath often silky. Flowers in clusters of 2–6 arranged in racemes terminal or opposite the leaves, or in

upper axils, often leafy at the base. Uppermost stamen more or less free. Pod compressed, beaked with the persistent style.

Species 120, widely spread through the warmer regions of the world, numerous in South Africa and Australia, a few in North America.

Leaflets in 12-20 pairs; pod 4·5-7 cm. l..... 1. *T. toxicaria*.
[Leaflets in 9-12 pairs; pod 8-10 cm. l..... *T. candida*.]
Leaflets not more than 10 pairs; pod not more than

5 cm. l.

Pod about 5 cm. l.

[Pod glabrous (except on margins) *T. grandiflora*.]

[Pod villose *T. noctiflora*.]

Pod with minute adpressed hairs, 8-10-seeded..... 4. *T. cinerea*.

Pod 3-4 cm. l., glabrous or puberulous, 5-6-seeded.

Calyx 3-3·5 mm. l.; teeth as long as the tube.... 2. *T. purpurea*.

Calyx 4·5-5 mm. l.; teeth nearly twice as long

as the tube..... 3. *T. Wallichii*.

Flowers less than 2 cm. l.

Flowers more than 1 cm. l..... 1. *T. toxicaria*.

Flowers not more than 1 cm. l.

Calyx with minute adpressed hairs.

Calyx 3-3·5 mm. l.; teeth as long as the tube.... 2. *T. purpurea*.

Calyx 4·5-5 mm. l.; teeth nearly twice as long

as the tube..... 3. *T. Wallichii*.

Calyx with long white hairs, 4·5-6 mm. l..... 4. *T. cinerea*.

[Calyx with long reddish-yellow hairs, 3-4 mm. l.... *T. noctiflora*.]

Flowers 2 cm. l. or more.

[Leaflets 1-2 cm. l..... *T. grandiflora*.]

[Leaflets 3-5 cm. l..... *T. candida*.]

1. *T. toxicaria* Pers. *Syn. ii.* 329 (1807); leaflets in 12-20 pairs, 2·5-7 cm. l.; racemes terminal and axillary; flowers more than 1 cm. l.; pod 4·5-7 cm. l.—*Tussac Fl. Ant. i. t. 20*; *Benth. in Fl. Bras. xv. pt. 1*, 46, t. 8; *Macf. Jam. i.* 255; *Griseb. Fl. Br. W. Ind.* 182. *Cracca leguminibus strictis Plum. Pl. Amer. (Burm.) t. 135.* *Galega toxicaria, Sw. Prodr.* 108 (1788) & *Fl. Ind. Occ.* 1278. *Cytisus? fruticosus erectus et villosus &c. Browne Hist. Jam.* 296. (Fig. 4.)

Surinam Poison.

Lane in *Herb. Sloane clxii.* 85! “Cultivated, rarely wild,” *Macfadyen*; *Brandon Hill*, 1000 ft. (fls. white) *Thompson!* *Mavis Bank* (cult.). *Fl. Jam.* 8045.—West Indies, tropical continental America.

Shrubby, 2-5 ft. high; branches velvety. *Leaves* 1-2 dm. l., leaflets narrowly oblong, shortly stalked, silky-pubescent, especially beneath, stipules awl-shaped. *Flowers* white with a purplish tinge, in clusters of 4-6 in many-flowered *racemes*, 1-3 dm. l. *Calyx* silky, about 5 cm. l.; segments ovate. *Corolla*: standard silky outside, roundish, clawed, 1·2 cm. l. (or more); wings and keel about as long as standard. *Pod* silky-pubescent.

Browne (*loc. cit.*) states: “This plant has been introduced to Jamaica from the main, and is now cultivated in many parts of the island, on

account of its intoxicating qualities.... The leaves and branches being well pounded, and thrown into any river, pond, or creek, are observed to infect the waters very soon; by which all the fish are immediately intoxicated, and rise and float upon the surface, as if they were dead; from whence they are easily taken. But most of the large ones that are left, recover from this trance after a short time, though the greatest part of the small fry perish on those occasions."

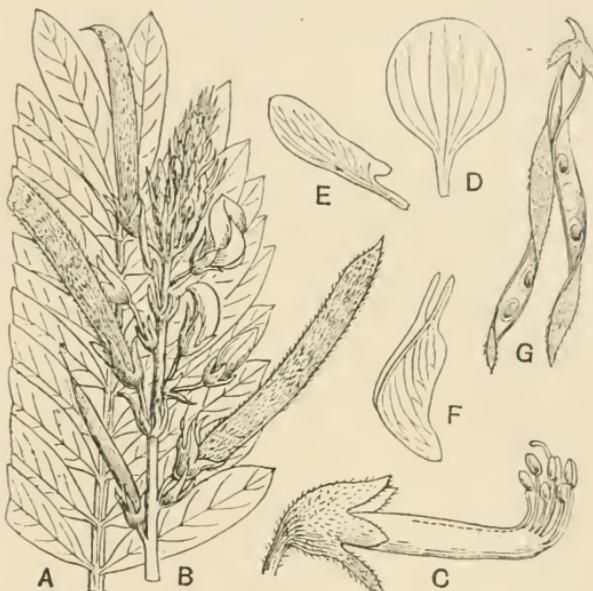


Fig. 4.—*Tephrosia toxicaria* Pers.

- A, Upper portion of leaf $\times \frac{2}{3}$.
- B, Upper portion of raceme $\times \frac{2}{3}$.
- C, Flower with corolla removed $\times 2$.
- D, Standard flattened $\times \frac{2}{3}$.

- E, Wing $\times \frac{2}{3}$.
- F, Keel $\times \frac{2}{3}$.
- G, Pod $\times \frac{2}{3}$.

(After Fl. Bras.)

2. *T. purpurea* Pers. *Syn. ii.* 329 (1807); ascending; leaflets in 6–10 pairs; calyx 3–3·5 mm. l., teeth as long as the tube, acuminate; blade of standard elliptical-roundish, broader than long, 6 mm. l., 7·3 mm. br.; claw cuneate, 2 mm. l.; pod 6-seeded (3–5), 3–4 cm. l., glabrous or strigillose.—*Bak. in Hook. f. Fl. Br. Ind. ii.* 112; *Robinson in Bot. Gaz. xxviii.* 201. *T. leptostachya* DC. *Prodr. ii.* 251; *Benth. tom. cit. 48*; *Griseb. loc. cit.* *T. ascendens* Macf. *Jam. i.* 257 (1837). *Cracca purpurea* L. *Sp. Pl.* 752 (1753). *Galega purpurea* L. *Sp. Pl. ed. 2.* 1063 (1763). *Coronilla zeylanica* herbacea &c. *Burm. Zeyl.* 77, t. 32. *Cracca leguminibus strictis adscendentibus glabris racemosis* &c. L. *Fl. Zeyl.* 140. Type in Herb. Hermann in Herb. Mus. Brit.

Lane in Herb. Sloane clxii. 83! Houstoun! Shakspear! Macfadyen!
Clermont, St. David, McNab! Hope River Mouth; Liguanea Ridge,

St. Andrew, 1000 ft.; *Harris!* Fl. Jam. 9385, 12,205.—Tropical and subtropical regions.

Somewhat shrubby, rising to 1 or 2 ft. high, branches glabrous or adpressed pubescent, angular. Leaflets linear-oblong to narrowly oblanceolate, glabrescent on the upper surface, glaucous, obscurely silky with minute white hairs beneath, 1-2 cm. l., 2-5 mm. br.; stipules 4-7 mm. l., lanceolate-awl-shaped. Flowers pale purplish or white, or crimson, solitary or in clusters of 2 or 3 in racemes, which are opposite to a leaf, lax-flowered, to 1 dm. l. Calyx with minute adpressed hairs. Corolla: standard silky outside; wings, blade oblong, about 5 mm. l., claw about 2·5 mm. l.; keel about as long as wings. Style glabrous; stigma with very short hairs. This species has been used for green dressing.

3. *T. Wallichii* *Graham* in *Wall. Cat. n.* 5640 (nomen); *Fawc. & Rendle* in *Journ. Bot. lv.* 35 (1917); leaflets in 5-9 pairs; calyx 4·5-5 mm. l., teeth nearly twice as long as the tube; blade of standard elliptical-roundish, broader than long, 6 mm. l., 8 mm. br., claw cuneate, 2 mm. l.; pod 5-6 seeded, 3-3·5 cm. l., puberulous or glabrous. Type in Herb. Wallich in Herb. Kew.

Broughton! Palisadoes, *Harris!* Fl. Jam. 6753.—Dominica, Trinidad, Guiana, India.

Somewhat shrubby; branches glabrous or pubescent, at length terete. Leaflets cuneate-oblong, green, glabrescent on the upper surface, glaucous and obscurely silky with minute white hairs beneath, 1·5-2·5 cm. l., 1·5-1·5 cm. br.; stipules 5-7 mm. l., linear-lanceolate. Flowers crimson or white, solitary or in clusters of 2 or 3 in racemes, which are opposite to a leaf, lax-flowered, to 1 dm. l. Calyx with minute adpressed hairs; segments setaceous. Corolla: standard silky outside; wings, blade oblong, about 5 mm. l., claw about 1·5 mm. l.; keel, apex close to apex of wings. Style glabrous; stigma with very short hairs.

4. *T. cinerea* *Pers. Syn. ii.* 328 (1807); more or less procumbent; leaflets in 3-5 (6) pairs; calyx 4·5-6 mm. l., teeth as long as the tube to half as long again; blade of standard roundish, rhomboid-roundish, or ovate-roundish, 8·5-9 mm. l., 9 mm. br., claw 2·5 mm. l.; pod generally 8-10-seeded, 4-5 cm. l., with minute white adpressed hairs.—*Benth. tom. cit.* 48; *Griseb. loc. cit.*; *Urb. Symb. Ant. iv.* 283. *T. procumbens Macf. Jam. i.* 256. *Galega cinerea L. Syst. ed.* 10, 1172 (1759) & *Amoen. v.* 403; *Jacq. Ic. Pl. Rar. t.* 575. *Galega herbacea &c. Browne Hist. Jam.* 289. Type in Herb. Linn.

Wright! *Broughton!* *Shakspear!* *Macfadyen!* *Distin!* St. Andrew, *McNab!* Constant Spring, 1000 ft.; Palisadoes; *Harris!* Fl. Jam. 6038, 6752.—West Indies, tropical and subtropical America.

Somewhat shrubby; branches 1 ft. or more long, at length terete, white-pubescent with adpressed or spreading hairs. Leaflets oblanceolate-oblong, glabrescent or with minute adpressed hairs on the upper surface, silky-pubescent and ash-coloured beneath, 1·8-3 cm. l. (or more in var.), 3-5 mm. br. (or more in var.); stipules white-pubescent, lanceolate, 5-6 mm. l. Flowers showy, rose-coloured, solitary or in clusters of 2 or 3 in racemes, which are opposite a leaf, and to 1·5 dm. l. Calyx silky with long white hairs. Standard silky outside; wings, blade 9 mm. l., 4 mm. br., claw 2·2 mm. l.; keel, claw about 1 cm. l. Style glabrous; stigma long-ciliate.

Var. *littoralis* Benth. in *Fl. Bras.* xv. pt. 1, 48 (1859) : pubescence denser, and on petioles and branches spreading ; leaflets in 5–6 pairs, larger, 2–4 cm. l., 5–12 mm. br.—*Griseb. loc. cit.* *T. littoralis* Pers. *Syn. ii.* 329 (1807). *Vicia littoralis* Jacq. *Sel. Stirp. Amer.* 206, t. 124 (1763). *Galega littoralis* L. *Syst. ed.* 12, 497 (1767) ; *Jacq. Sel. Stirp. Amer. ed. pict.* t. 192 (1780?). Jacquin's original specimen from which t. 124 and the coloured t. 192 were drawn, is in *Herb. Mus. Brit.*

Macfadyen! King's House grounds, 600 ft., *Harris!* *Fl. Jam.* 6956.—Colombia, Guiana, Brazil.

[*T. candida* DC. *Prodri. ii.* 249 (1825) ; leaflets in 9–12 pairs, 3–5 cm. l. ; flowers 2–2·5 cm. l. ; pods 8–10 cm. l.—*Bak. in Hook. f. Fl. Brit. Ind. ii.* 111.]

Naturalized, presumably an escape from the Botanic Gardens; *Morris!* near Castleton ; near Hope Bay ; *Harris!* Golden Spring, 800 ft., *Thompson!* *Fl. Jam.* 6081, 7988, 9040, 11,804.—India, Malay Is.

Shrub 4–10 ft. high, bushy ; branches covered with velvety pubescence. Leaves 1·5–2·5 dm. l. ; leaflets narrowly oblong, acute, glabrous on upper surface, grey and silky beneath. Flowers reddish, yellow or white, solitary or in clusters in terminal and lateral racemes which are long or contracted (to 1·5 dm. l.). Calyx densely silky, about 5 mm. l. ; teeth deltoid, shorter than the tube. Corolla white ; standard densely silky outside, about 2 cm. l. Pod 10–15-seeded, straight or slightly recurved, with adpressed brown silky hairs.]

This species and others have been used as cover crops and green dressing.

[*T. noctiflora* Bojer ex Bak. in *Fl. Trop. Afr. ii.* 112 (1871) : leaflets in 6–9 pairs, narrowly oblanceolate, apex rounded or emarginate, mucronate, 2·5–4·5 cm. l., 5–8 mm. br. ; stipules filiform, villose, 6–9 mm. l. ; calyx pubescent with long reddish-yellow hairs ; tube 2 mm. l., the lower tooth lanceolate, equalling the tube, the others shorter and deltoid ; pod 8–9-seeded, 4–5 cm. l., 5–6 mm. br., densely clothed with fine brown silky hairs, slightly curved upwards.

Naturalized ; Brandon Hill, 1000 ft., *Thompson!* Asylum grounds, near Kingston, *Plaxton!* also *Fawcett!* King's House grounds, 600 ft., *Harris!* *Fl. Jam.* 6952, 8054.—Africa.

Spreading shrubby plant, 4–6 ft. high, densely clothed with short brown pubescence. Leaves 8–13 cm. l. ; petiole pubescent ; leaflets glabrous on upper surface, silky and grey beneath with adpressed hairs. Flowers white, standard variegated with purple, in small remote clusters in a raceme which is opposite a leaf, 1·5–3·5 dm. l. Corolla : standard pubescent on the outside, ovate-roundish, apex deeply emarginate and retuse, 8 mm. l., about 1 cm. br., claw 2 mm. l. ; wings, obovate-oblong, blade 8 mm. l., claw 2 mm. l. ; keel blade 8 mm. l., claw 2 mm. l., apex close to apex of wings.

[*T. grandiflora* Pers. *Syn. ii.* 329 (1807) ; leaflets in 5–7 pairs, 1–2 cm. l. ; flowers 2–2·5 cm. l. ; pod glabrous (except on the margins), about 5 cm. l.—*Harr. in Fl. Cap. ii.* 209 ; *Griseb.*

loc. cit. *Galega rosea Lam. Encyc. ii. 599 (1786).* *G. grandiflora Vahl Symb. ii. 84 (1791).*

Naturalized in Blue Mts., *Wilson*; *Prior*; *Cinchona, J.P. 1176, Morris!* also *Clute!* Blue Mt. Peak, *Hitchcock*.—S. Africa, Rhodesia to Cape.

Shrubby, erect, 1-2 ft. high; stem and branches puberulous or sub-glabrous. Leaflets oblong, glabrous on the upper surface, puberulous or glabrescent beneath, 3-5 mm. l.; stipules ovate, acute, many-nerved, 5-8 mm. l. Flowers showy, rosy-purple, large, in corymbose clusters at ends of branches. Bracts broadly ovate, enclosing the young flower-bud, deciduous. Calyx puberulous-silky, 5-7 mm. l.; segments awl-shaped. Corolla: standard silky outside, blade roundish, about 2 cm. l.]

[**GLIRICIDIA** H. B. & K.]

Trees or shrubs. Leaves alternate, here and there sub-opposite; leaflets entire, opposite. Racemes appearing before the leaves, or axillary. Calyx campanulate, entire or obsoletely 5-toothed. Standard roundish, reflexed, clawed, with 2 lobes inside above the claw; wings oblong, free; keel curved. Uppermost stamen free. Pod broadly linear, flat-compressed, margins slightly thickened. Seeds 3-6, flat, roundish-elliptical.

Species 3 or 4, natives of tropical America.

G. sepium *Steud. Nomencl. ed. 2, i. 688 (1841); Urb. Symb. Ant. ii. 288, iv. 284.* *G. maculata Steud. loc. cit.* *Robinia sepium Jacq. Enum. Pl. Carib. 28 (1760) & Sel. Stirp. Amer. 211.*

Cultivated for fences and subs spontaneous in West Indies; *Hope, Harris!* Fl. Jam. 8453.—Native in Central America and Colombia.

Small tree or shrub to 20 ft. high. Leaflets in 4-8 pairs, lanceolate, elliptical, or ovate, 3-6 cm. l., glabrous. Calyx .5 cm. l. Corolla lilac-rosy and white; standard (excl. claw) about 2 cm. l., claw .5 cm. l.; wings (incl. claw) about 2.3 cm. l.; keel (incl. claw) about 1.8 cm. l., claw 6 mm. l. Style bent at a right angle to pistil. Pod 10-12 cm. l., 1 to nearly 2 cm. br. Seeds about 1 cm. l.]

5. SESBANIA Scop.

Herbs or shrubs (in *S. grandiflora* arborescent but short-lived). Leaves abruptly pinnate, leaflets entire in many pairs. Racemes axillary, lax. Calyx 5-toothed (cr in *S. grandiflora* campanulate, toothed-wavy). Standard roundish or ovate. Uppermost stamen free, the rest united into a sheath; anthers all alike or the alternate a little longer. Pod long, with transverse partitions between the seeds, 2-valved or sometimes scarcely opening.

Species 20, widely dispersed through the tropics.

Flowers not more than 1 inch long; buds straight.

Plants glabrous.

- | | |
|---|--------------------------|
| Leaflets in less than 20 pairs..... | 1. <i>S. Sesban.</i> |
| Leaflets in more than 20 pairs. | |
| Flowers 2-2.4 cm. l. | 2. <i>S. exasperata.</i> |
| [Flowers 1-1.2 cm. l.] | <i>S. bispinosa.</i>] |
| Plants pubescent | 3. <i>S. sericea.</i> |
| [Flowers 3 inches long; buds curved | <i>S. grandiflora.</i>] |

1. *S. Sesban* comb. nov. ; glabrous ; branches without prickles ; leaflets in 10-18 pairs ; flowers 1·5-1·8 cm. l.—*S. aegyptiaca* Pers. *Syn. ii.* 316 (1807) ; *Wight Ic. t. 32* ; *Griseb. Fl. Br. W. Ind.* 184 ; *Bedd. Fl. Sylv. Anal. Gen. t. 12, f. 3* ; *Bak. in Hook. f. Fl. Brit. Ind. ii.* 114 ; *Urb. Symb. Aut. iv.* 286. *Sesban Alp. Pl. Egypt.* t. 82. *Æschynomene Sesban L. Sp. Pl.* 714 (1753). (Fig. 5.) Type in Herb. Linn.

Seashore, *Wilson!* March! cult. Hope Gardens, *Harris!* Fl. Jam. 8617.—Cuba, Porto Rico, south-eastern America, tropical and subtropical Africa, tropical Asia, northern Australia.

Soft-wooded shrub 6-10 ft. high. Leaves 1-1·5 dm. l. ; leaflets oblong-linear, 2-3 cm. l., ·5 cm. br. Racemes 3-12-flowered, 3-15 cm. l. Calyx,

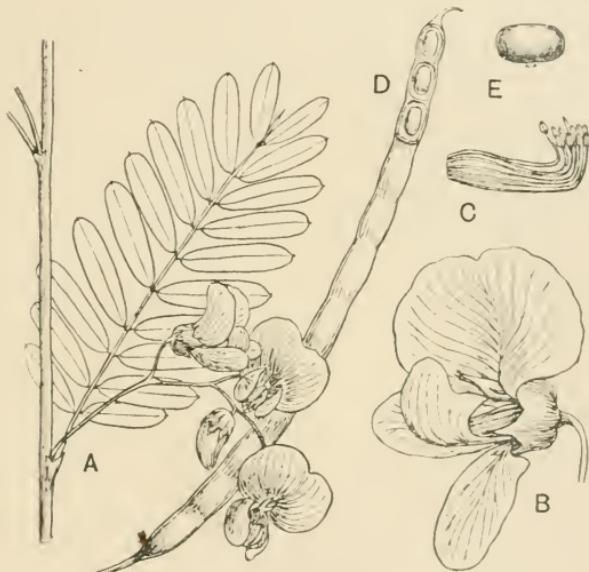


Fig. 5.—*Sesbania Sesban* Fawc. & Rendle.

A, Portion of flowering branch $\times \frac{2}{3}$.
B, Flower partly opened $\times \frac{2}{3}$.
C, Stamens $\times 2$.

D, Pod, partly opened to show the seeds, $\times \frac{2}{3}$.
E, Seed $\times 2$.

tube 4 mm. l., teeth about 1 mm. l. Corolla : standard transversely broadly elliptical, somewhat cordate, 1·5-2 cm. l., 1·7-2·3 cm. br.; 2 large calli at the base running down into the claw, above the base free, lanceolate, acuminate ; wings, blade 14 cm. l., claw about ·5 cm. l.; keel, blade short, ·7-·8 cm. l., claw as long. Pod 15-23 cm. l., slightly torulose, compressed, at length cylindrical, beaked with the persistent style. The colour of the flowers is very varied ; some are creamy white with standard finely streaked beneath with dark purple, some are bright yellow, others yellow or creamy white with standard edged with dark red, and some variegated orange and scarlet.

2. *S. exasperata* H. B. & K. in *Nov. Gen. & Sp. vi.* 534 (1824) ; glabrous ; branches generally without any prickles, but

sometimes rough; leaflets in 30–40 (25–50) pairs; flowers 2–2·4 cm. l.—*Benth. in Fl. Bras. xv. pt. 1, 42*; *Griseb. loc. cit.*; *Hook. f. in Bot. Mag. t. 7384* (leaves not good).

Purdie!—Trinidad, tropical continental America.

Herb or undershrub 3–8 ft.; branches angular. Leaves 2–3 dm. l., leaflets oblong-linear, irritable, mucronate, 1·5–2·5 cm. l., 3–6 mm. br. Inflorescence 4–6-flowered, 8–12 cm. l. Calyx, tube 4–5 mm. l., teeth 2–3 mm. l. Corolla: standard 2–2·5 cm. l.; wings oblong, equalling the standard. Pod 20–25 cm. l., compressed, only slightly or not torulose, with a long beak.

[*S. bispinosa Steud. Nomencl. ed. 2, ii. 572 (1841)*; glabrous; branches rough with short prickles; leaflets in 30–50 (20–) pairs; flowers 1–1·2 cm. l.—*S. aculeata Pers. loc. cit. (1807)*; *Griseb. loc. cit.*; *Bak. loc. cit.*; *Plants of Cook's First Voy. t. 63 & ic. in ed. pict.* *S. muricata Macf. Jam. i. 257 (1837)*. *Æschynomene bispinosa Jacq. Ic. Pl. Rar. 13, t. 564 (1797)*. *Coronilla aculeata Willd. Sp. Pl. iii. 1147 (1800)*.

Naturalized, Windward Road, *Macfadyen!* also naturalized in some other islands of the West Indies.—Tropics of Old World.

Shrub 5 ft. high. Leaves 1·5–3 dm. l.; leaflets oblong-linear, mucronate, 1–2 cm. l., 2–3 mm. br.; leaf-rachis with small prickles beneath. Racemes 2–8-flowered, 3–7 cm. l. Calyx, tube 3–4 mm. l., teeth 1–1·5 mm. l. Corolla: standard about 1 cm. l., yellow with small purple spots outside; wings oblong. Pod 2–3 dm. l., 3 mm. br., not or only slightly torulose, compressed, at length biconvex, beaked.]

3. *S. sericea DC. Prodr. ii. 266 (1825)*; pubescent (except on upper side of the leaves); without prickles; leaflets in 12–25 pairs; flowers 8–9 mm. l.—*Griseb. loc. cit.*; *Urb. loc. cit.* *Coronilla sericea Willd. Enum. 773 (1809)*.

Ferry, *Campbell!* brackish swamps between Kingston and Spanish Town, *Harris!* Kingston, *Hitchcock*; *Fl. Jam. 6171, 9051*.—Bahamas, Hispaniola, Porto Rico, St. Thomas, Antigua, Guadeloupe, Martinique.

Slender branching shrub, 10 ft. high. *Leaves 1–2 dm. l.; leaflets oblong-linear, mucronate, with appressed silky hairs beneath, irritable, 1·5–2·5 cm. l., 4–7 mm. br. Inflorescence 4–6-flowered, about 4 cm. l. Calyx, tube 3–4 mm. l.; teeth about 1 mm. l. Corolla yellow, externally tawny, standard 8–9 mm. l., dotted with purple. Pod 1–2 dm. l., 3 mm. br., terete, shortly beaked.*

[*S. grandiflora Pers. Syn. ii. 316 (1807)*; small tree, with large flowers, 7·5 cm. l., and curved flower-buds; leaflets in 12–22 pairs.—*Urb. loc. cit.* *Robinia grandiflora L. Sp. Pl. 722 (1753)*. *Æschynomene grandiflora L. Sp. Pl. ed. 2, 1060 (1763)*. *Agati grandiflora Desv. Journ. Bot. i. 120, t. 4, f. 6 (1813)*; *Griseb. op. cit. 183*. Type in *Herb. Linn.*

Cultivated and apparently spontaneous, *Shakspear!*—W. Indies, India, Mauritius to N. Australia and Polynesia. Native country unknown, probably India or Australia.

Leaves 1·5–3 dm. l.; leaflets oblong, mucronate, 2–4 cm. l., 7–12 mm. br.

Racemes 2-flowered, very short. Calyx campanulate, toothed-wavy, about 2 cm. l. Corolla 6–7 cm. l., rosy-white or red. Pod compressed, elongate, linear, with swollen margins, slightly torulose, pendulous, to more than 3 dm. l.; seeds separated by ingrowths from the walls.

§ 4. Herb sometimes shrubby below, or shrubs, not twining nor climbing, or rarely shrubs, or even (in *Brya*) small trees. Leaves imparipinnate, leaflets 1–several, or digitately 2–4-foliate in *Zornia*; petiole not bearing a tendril. Stamens 10, united into a sheath, closed or split above or both above and below, or sometimes the uppermost stamen is more or less free. Pod jointed, not or rarely opening along the lower margin; joints 1-seeded, usually breaking away from one another when ripe; sometimes by abortion of the ovules 1-jointed and 1-seeded.

6. BRYA DC.

Shrubs or small trees. Leaves imparipinnate (in *B. Ebenus*, 1–3 foliolate with scarcely any common petiole). Stipules (in Jamaican species) subspinescent. Flowers in axillary or sub-terminal cymes or clusters. Bracts and bracteoles small, persistent. Calyx 5-lobed. Standard roundish. All the stamens

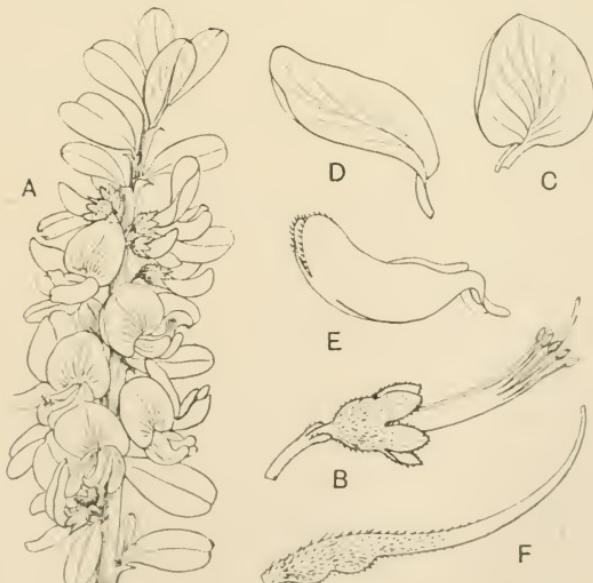


Fig. 6.—*Brya Ebenus* DC.

A, Upper portion of flowering branch $\times \frac{1}{2}$.

B, Flower with corolla removed $\times 3$.

C, Standard $\times 2$.

D, Wing $\times 3$.

E, Keel $\times 3$.

F, Ovary and style $\times 5$.

(After Bot. Mag.)

united into a sheath, split above, slightly unequal. Ovules 2. Pod divided into 1 or 2 broad flat joints, not splitting open.

Species 3, one a native of Jamaica and Cuba, another of Hispaniola, and the third of Nicaragua.

B. Ebenus DC. *Prodr. ii.* 421 (1825); *Macf. Jam. i.* 301; *Bot. Mag. t.* 4670; *Griseb. Fl. Br. W. Ind.* 189. *Ebenus jamaiensis* *Pluk. Phyt. t.* 89, *f. 1 & Alm.* 132. *Aspalathus arboreus* &c. *Sloane Cut.* 140 & *Hist. ii.* 31, *t.* 175, *f. 1.* *Brya arborescens* &c. *Browne Hist. Jam.* 299, *t.* 31, *f. 2.* *Pterocarpus foliis* &c. *Plum. Pl. Amer. (Burm.)* 243, *t.* 246, *f. 1.* *Aspalathus Ebenus L. Sp. Pl. ed. 2,* 1001, (1763). *Spartium arborescens Mill. Gard. Dict. ed. 8* (1768). *Amerimnon Ebenus Sw. Prodr.* 104 (1788) & *Fl. Ind. Occ.* 1235. (Fig. 6.) Type in *Herb. Mus. Brit.* & in *Herb. Linn.*

West Indian Ebony, Cocus Wood.

Common on the plains and dry hills on the south; *Sloane Herb. vi. 14!* *Catesby* in *Herb. Sloane clxii.* 74! *Houstoun!* *Browne!* *Shakspear!* *Masson!* *Macfadyen!* *McNab!* *Lane!* Blue Mts., *Hitchcock!* Poros, *Lloyd!* Craig Hill; Hope grounds; *Harris!* *Fl. Jam.* 8635.—Cuba.

Shrub or small tree 15–25 ft. high, with clustered branches which are armed with short sharp foliar prickles subtending a reduced leafy shoot. Leaflets small, elliptical or obovate-elliptical, deciduous in dry weather, 7–17 mm. l. Flowers of a bright yellow or orange colour. Calyx about 3 mm. l. Corolla: standard about 1 cm. l., .8 cm. br.; wings 9 mm. l. (incl. claw), claw 2 mm. l. Ovary villose. Pod 2-jointed, upper joint small, abortive.

The heart wood is of rich brown, almost black, colour. It is excessively hard—as hard as ebony or lignum-vitæ—and harder than boxwood. The grain is very fine, dense and even. It is particularly adapted for turnery, and is used for flageolets, inlaying, and cabinet making. Weight 77 to 87 lbs. per cubic foot.

7. *ÆSCHYNOMENE* L.

Leaves irritable, imparipinnate but sometimes without the terminal leaflet; leaflets numerous, small. Stipules lanceolate or ovate. Racemes generally axillary. Bracts usually stipule-like; bracteoles adpressed to the calyx. Calyx 2-lipped (in Jamaican species). Standard roundish. Stamens 10, united into a sheath, split on one side (in *Æ. biflora*), or on both sides (in *Æ. americana*). Pod, joints 2-several, square or semicircular, usually not opening.

Species about 160, of which 2 (or 3) are widely dispersed in the tropics in Asia and Africa, 1 also in Australia, 1 in S. America and also in Africa and Australia, 1 in N. America and S. Africa, 3 or 4 peculiar to Africa, all the rest American from Patagonia to N. America.

Stipules continued below the attachment..... 1. *Æ. americana.*

Stipules not continued below the attachment... 2. *Æ. biflora.*

1. *Æ. americana* L. Sp. Pl. 713 (1753); hirsute; leaflets in 10–30 pairs, linear, 3–5-nerved; stipules linear-lanceolate, continued below the attachment, the whole 1–2 cm. l.—*Lam. Illustr.* t. 629, f. 2; *Macf. Jam.* i. 263; *Benth. in Fl. Bras.* xv. pt. 1, 61; *Griseb. Fl. Br. W. Ind.* 185; *Urb. Symb. Ant.* iv. 287. *Hedysarum caule* &c. *Sloane Cat.* 74 & *Hist.* i. 186, t. 118, f. 3. *Æschinomene procumbens* &c. *Browne Hist. Jam.* 295. (Fig. 7.) Type in Herb. Mus. Brit.

Sloane Herb. iii. 90! “common on south side, especially about Old Harbour and in the lower hills of Liguanea,” *Browne!* *Wright!* *Broughton!* *Masson!* *Macfadyen!* Manchester, *Purdie!* King’s House grounds, J.P. 1111,

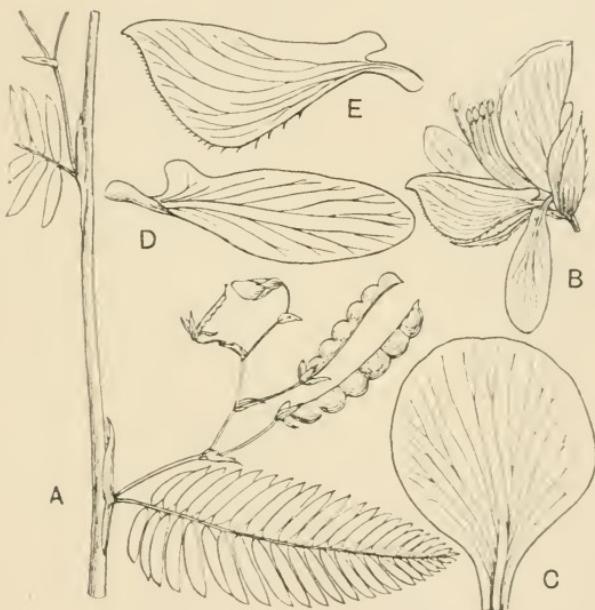


Fig. 7.—*Æschynomene americana* L.

A, Portion of stem with leaf and inflorescence $\times \frac{2}{3}$.
B, Flower opened out $\times 3$.

C, Standard $\times 5$.
D, Wing $\times 5$.
E, Keel $\times 5$.

Hari! Constant Spring, Port Morant, Port Antonio, Lucea, *Hitchcock*; Porus, *Lloyd*; Hope grounds, *Harris!* Fl. Jam. 6625, 6957.—West Indies, tropical continental America.

Stem somewhat shrubby, 2–3 ft., erect or ascending. Leaves 5–7 cm. l., leaflets linear, mucronate, oblique at the base, finely toothed near the apex of the lower margin, glabrous, 1–1.5 cm. l., 1–2 mm. br. Inflorescence laxly few-flowered. Flowers 6–8 mm. l. Corolla, standard flesh-colour with a tinge of yellow. Pod shortly stalked, 4–8-jointed, contracted between the seeds; joints semicircular, about 5 mm. l., 3–4 mm. in diam.

2. *Æ. biflora* comb. nov.; glandular-hirsute; leaflets in 4–7 pairs, elliptical or obovate-elliptical, 1-nerved with pinnate

veining; stipules ovate, many-nerved, 3–5 mm. l.—*Æ. brasiliiana DC. Prodr. ii. 322 (1825)*; *Benth. tom. cit. 68*; *Griseb. loc. cit.* *Senna spuria minima &c. Houstoun MS.* *Cassia biflora Miller Gard. Dict. ed. 8 (1768).* *C. Houstoniana Collad. Hist. Cass. 132 (1816).* *Hedysarum brasiliatum Poir. Encyc. vi. 448 (1804).* Type in *Herb. Mus. Brit.*

Houstoun!—Cuba, St. Lucia, Trinidad, tropical continental America.

Stem shrubby, 2–3 ft. high, diffuse. Leaves 2–3 cm. l.; leaflets ciliate, glabrous on upper surface, with a few adpressed hairs beneath, 1·8–2 cm. l., 4–6 mm. br. Inflorescence laxly paniculate, several-flowered. Flowers about 7 mm. l. Pod 1–4-jointed, contracted between the joints; joints semicircular-roundish, 3–4 mm. in diam.

Miller states in his Gardener's Dictionary that "This grows naturally in Jamaica, from whence the seeds were sent me." A specimen with the name in his own handwriting and marked "Jamaica, 1730, Houstoun," is in *Herb. Mus. Brit.* But we have not seen any other specimen collected in Jamaica.

8. STYLOSANTHES Sw.

Leaves pinnately 3-foliolate. Stipules united to the leaf-stalk. Inflorescence terminal or axillary, forming dense heads or spikes; flowers subsessile at the axil of a leaf or of a 2-lobed bract, sometimes solitary with 2 or 3 bracteoles, sometimes with a bristle-like abortive axis. Calyx-tube long, stalk-like; 4 upper lobes united, lowest distinct, narrow, or, the 2 upper lobes united nearly to the apex, the remaining 3 distinct (in *S. hamata*). Standard roundish. Stamens 10, all united into a closed sheath; anthers alternately longer, subbasifixed, and short, versatile. Pod compressed, apex with a hooked beak, the persistent lower part of the style; joints 2, or 1 (with the lower abortive).

Species 25 to 30, natives of Asia, Africa, N. America, West Indies, but chiefly of S. America.

Not viscous; leaflets lanceolate; beak of pod as long as joint 1. *S. hamata*. Viscous-pubescent; leaflets elliptical; beak very short..... 2. *S. viscosa*.

1. *S. hamata* Taub. in *Verh. Bot. Brand. xxxii. 22 (1890)*; pubescent or subglabrous; leaflets lanceolate; beak about as long as the pod.—*Urb. Symb. Ant. iv. 288.* *S. procumbens Sw. Prodr. 108 (1788), in Svensk Vet. Akad. Handl. 1789, 297, t. 11, f. 1 & Fl. Ind. Occ. 1282;* *Macf. Jam. i. 262;* *Griseb. Fl. Br. W. Ind. 188.* *Anonis non spinosa minor &c. Sloane Cat. 75 & Hist. i. 187, t. 119, f. 2.* *Trifolium procumbens &c. Browne Hist. Jam. 298.* *Hedysarum hamatum L. Syst. 1170 (1759) (excl. syn. Burm.), Amæn. v. 403 & Sp. Pl. ed. 2, 1056 (excl. syn. Burm.). (Fig. 8.)* Type in *Herb. Mus. Brit.*

Pencil Flower.

St. Jago de la Vega, Sloane, Herb. iii. 94! *Lane in Herb. Sloane clxii. 76!* *Houstoun!* *Wright!* *Broughton!* *Browne;* *Bancroft!* common in

pastures, Macfadyen! St. Andrew, McNab! Purdie! Liguanea plain, 380 ft.; Campbell! near Kingston; between Kingston and Morant Bay; Watson Hill; Fawcett! Kingston, Port Morant, Hitchcock; Fl. Jam. 6019, 6113, 8249, 8397.—Bahamas, Cayman, West Indies from Cuba to Grenada, Florida, Mexico, Guatemala, Colombia.

Stem procumbent or ascending, woody at base, 1–3 or 4 dm. l. *Leaflets* 7–1·7 cm. l., 2–6 mm. br., subglabrous, margin generally ciliolate; nerves

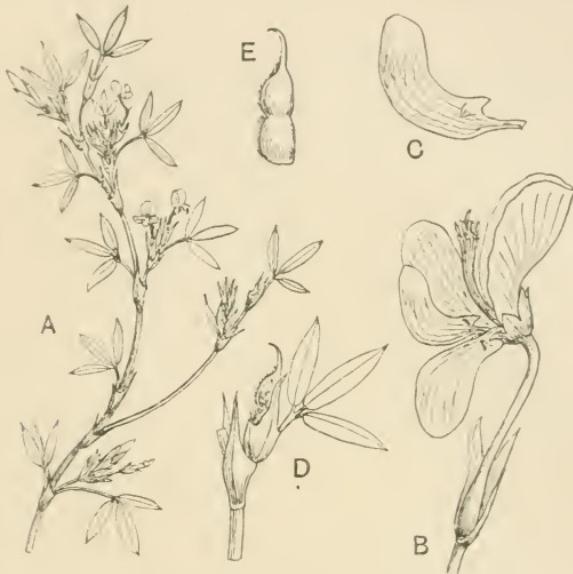


Fig. 8.—*Stylosanthes hamata* Taub.

A, Portion of flowering branch $\times \frac{2}{3}$. D, Portion of flowering branch with pod $\times 2$.
 B, Flower with one wing turned down $\times 5$. C, Wing, inner face $\times 5$.
 E, Pod $\times 2$.

prominent beneath. *Bracts* leaf-like, often without 1 or 2 leaflets, bearing in the axil a flower and a bristle-like hairy stalk; bracteoles hyaline. *Calyx*: tube 3·5 mm. l., limb 2·5 mm. l., 2 upper lobes united nearly to the apex, the remaining 3 distinct. *Corolla* yellow, standard 4·5 mm. l.; wings 3·7 mm. l.; keel 3 mm. l. *Pod*, including the beak, nearly 1 cm. l.

2. *S. viscosa* Sw. Prodr. 108 (1788); viscous-pubescent; leaflets narrowly elliptical; beak of the pod very short.—*Sw.* in Svensk Vet. Acad. Handl. 1789, 298, t. 11, f. 3 & Fl. Ind. Occ. 1285; *Macf. Jam.* i. 262. *S. glutinosa* H. B. & K. Nor. Gen. & Sp. vi. 507, t. 595 (1824). *Loto pentaphyllo* &c. Sloane Cat. 74 & Hist. i. 186, t. 119, f. 1. *Trifolium suberectum* &c. Browne Hist. Jam. 299. *Hedysarum hamatum*, var. *viscosa* L. Amæn. v. 404 (1760) (excl. ref. to *Burm.*) & var. β L. Sp. Pl. ed. 2, 1056. Type in Herb. Mus. Brit.

Sloane Herb. iii, 93! *Lane* in Herb. Sloane lxii. 76! *Browne*; *Broughton*! *Shakspear*! common in pastures and roadsides, *Macfadyen*; *McNab*! *Purdie*! *Wullschlaegel*; *Oersted*! Spring Hill, Portland; Lititz savanna,

300-900 ft.; Two Mile Wood, St. Catherine; *Harris!* Fl. Jam. 6630, 11,764, 12,406.—Cuba, Mexico, tropical S. America.

Stem diffuse or suberect, much branched, woody at base, 2-10 dm. l. *Leaflets* .5-1 cm. l., to 5 mm. br., viscid-puberulous on both sides. *Bracts* as in *S. hamata*, bearing in the axil a flower, but no bristle-like stalk; bracteoles, one lanceolate, one linear, 3·5 mm. l. *Calyx*, stalk-like tube 4 mm. l., limb about 2 mm. l. *Corolla* orange-coloured; standard 4 mm. l. wings and keel nearly as long. *Pod* about 4 mm. l.

9. ZORNIA J. F. Gmel.

Leaves digitately 2- or 4-foliate, usually with pellucid dots. Stipules with a basilar appendage. Flowers distant in spikes or

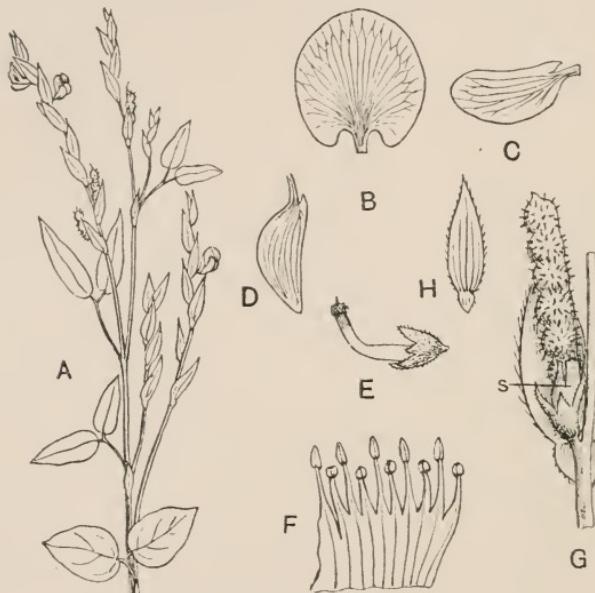


Fig. 9.—*Zornia diphyllea* Pers.

A, Upper portion of branch, with leaves and flower spikes $\times \frac{1}{2}$.

B, Standard $\times 3$.

C, Wing $\times 3$.

D, Keel $\times 3$.

E, Flower with corolla removed $\times 3$.

F, Upper portion of staminal sheath more highly magnified.

G, Ripe pod with one of the bracts removed $\times 3$; s, persistent staminal sheath.

H, Bract slightly magnified.

solitary; each flower enclosed by 2 bracts (stipules of abortive bracts). Calyx hyaline, ciliolate, 2 upper lobes united forming a broad emarginate upper lip, 2 lateral much smaller, lower equalling the upper lip. Standard roundish. Stamens 10, all united into a closed sheath; anthers alternately longer, subbasifix, and short, dorsifix. Pod compressed; joints not opening.

Species 11, all American, of which one grows in N. America and also at the Cape, one (*Z. diphyllea*) polymorphic, widely

dispersed through the warmer regions of the world, the rest all tropical American, chiefly Brazilian.

- Leaflets 2. Flowers in spikes..... 1. *Z. diphylla*.
- Leaflets 4. Flowers solitary..... 2. *Z. tetraphylla*.

1. *Z. diphylla* Pers. *Syn. ii.* 318 (1807) (with var. *ciliata* Pers.) ; leaflets 2 ; flowers in spikes.—*Benth. in Fl. Bras. xv. pt. 1*, 80, *tt. 21, 22* ; *Griseb. Fl. Br. W. Ind.* 185 ; *Urb. Symb. Ant. ir.* 289. *Z. reticulata* Smith in *Rees Cyclop. xxxix.* (1818) ; *Macf. Jam. i.* 261. *Hedysarum diphyllum* L. *Sp. Pl.* 747 (1753) ; *Sw. Obs. Bot.* 285. *Hedysarum minus* diphyllum &c. *Sloane Cat. 73 & Hist. i.* 185 ; *Houst. Cat. MS. f. 62.* *Onobrychis maderaspatana* &c. *Pluk. Phyt.* *t. 246, f. 6,* *Alm.* 270. *Hedysarum herbaceum procumbens* &c. *Browne Hist. Jam.* 301. (Fig. 9.) Type in *Herb. Mus. Brit.*

St. Jago de la Vega, *Sloane Herb.* iii. 89 ! Old Harbour, *Browne ! Liguanea, Broughton !* dry pastures in south side, *Macfadyen ; Purdie ! Wullschlaegel ; March ! Prior* ; amongst grasses in the savanna, Two Mile Wood Pen, St. Catherine, *Harris ! Fl. Jam.* 12,070.—Tropics.

Herbaceous, diffuse or ascending, glabrous or pubescent-villoso. Branches short or long, 1·5–4 dm. l. Leaflets 2, lanceolate, the lower shorter, elliptical, 1·5–4 cm. l. Bracts elliptical to lanceolate, 1–1·2 cm. l. Calyx about 3 mm. l. Corolla yellow; standard 8–1 cm. l. Pod puberulous, reticulate, more or less covered with spines, 2–6-jointed; joints rounded, about 3 mm. l.

2. *Z. tetraphylla* comb. nov. (non Michx.) ; leaflets 4 ; flowers solitary.—*Z. myriadena* Benth. in *Fl. Bras. xv. pt. 1*, 85 (1859). *Z. Sloanei* Griseb. *op. cit.* 709 (1864). *Quadrifolium erectum flore luteo* Sloane *Cat. 74 & Hist. i.* 186, *t. 116, f. 3.* *Ornithopus tetraphyllus* L. *Syst. ed. 10*, 1168 (1759), *Amaen. v.* 402 & *Sp. Pl. ed. 2*, 1049. *Myriadenus Desv. Journ. Bot. i.* 121, *t. 4, f. 11* (1813). *M. tetraphyllus DC. Prodr. ii.* 316 (1825) ; *Macf. Jam. i.* 260. Type in *Herb. Mus. Brit.*

Savanna, near Two Mile Wood, *Sloane Herb.* iii. 92 !—Cuba, Brazil.

Stems woody at the base, diffuse, slender, branching, puberulous. Leaflets usually 4 (sometimes 3), 1–1·3 cm. l., or sometimes less near the flowers, oblanceolate, apex rounded or retuse, glabrous or sometimes puberulous on the margin, dotted with pellucid glands. Peduncles one-flowered, solitary in the uppermost axils, 2–3 mm. l. Bracts elliptical, glandular-dotted, ciliolate, 4–5 mm. l. Calyx about 3 mm. l. Corolla yellowish, 12–13 mm. l. Pod glandular-dotted, glabrous or minutely puberulous with stellate hairs, 2–10-jointed; joints somewhat rectangular, about 2 mm. l.

10. DESMODIUM Desv.

Leaves pinnately 3-foliate (reduced to a single leaflet in *D. triquetrum* and *D. gangeticum*). Stipules striate, dry. Racemes terminal or sometimes also axillary, simple or paniculate. Flowers 1, or 2 or more in small clusters along the rhachis, or in a simple

cluster opposite the leaves. Calyx : tube short ; 2 upper lobes or teeth more or less united, 3 lower acute or acuminate. Standard obovate or roundish. Uppermost stamen united with the sheath or more or less free. Pod compressed, with flat joints, usually not opening, but splitting along the lower margin in *D. gyrans*, and the joints tardily opening in *D. triflorum* and *D. barbatum*.

Species 150, widely dispersed through tropical and subtropical regions, some in N. America, a few in S. America, the Cape, and Australia, but none in New Zealand, nor in Europe, nor temperate Asia.

Leaf-stalks not winged.

Flowers in lax racemes or panicles.

Pod indehiscent.

Upper margin of legume continuous.

Leaflets roundish-elliptical..... 1. *D. adscendens*

Leaflets oblong-elliptical, whitish beneath.... 2. *D. supinum*.

Upper margin of legume slightly notched.

Leaflets 3.

Stem 3-cornered with hooked hairs

Stem terete.

Stem trailing, rooting

[Erect shrub

[Leaflet 1.....

Both margins of legume equally notched.

Joints of legume equal and fertile.

Joints roundish to rhomboid.

Stem erect. Stipules semicordate.....

Stem procumbent. Stipules not semi-cordate.....

Joints linear-oblong.....

Joints only 2, one small sterile, the other larger fertile

[Pod dehiscing along the lower margin. Lateral leaflets small, moving by jerks.....

Flowers 2-4 in clusters opposite a leaf or in axil of leaf

Flowers crowded in dense corymbose terminal racemes.

Calyx hirsute.....

[Flowers numerous in axillary umbels.

Branches terete.....

Branches 3-angled

[Leaf-stalks winged; leaflet 1.....

1. *D. adscendens*

2. *D. supinum*.

3. *D. intortum*.

4. *D. axillare*.

D. cajanifolium.]
D. gangeticum.]

5. *D. purpureum*.

6. *D. procumbens*.

7. *D. scorpiurus*.

8. *D. molle*.

D. gyrans.]

9. *D. triflorum*.

10. *D. barbatum*.

D. umbellatum.]

D. cephalotes.]

D. triquetrum.]

1. ***D. adscendens DC.*** *Prodr. ii.* 332 (1825) ; stems decumbent, with diffuse ascending branches ; leaflets 3, roundish-elliptical ; stipules free from one another ; flowers in lax racemes ; upper margin of pod continuous, joints 2-5(-7), semielliptical or semi-circular, 4-5 mm. l.—*Benth. in Fl. Bras. xv. pt. 1*, 97 ; *Griseb. Fl. Br. W. Ind.* 186 ; *Urb. Symb. Ant. iv.* 290. *D. ellipticum Macf. Jam. i.* 268 (1837). *Hedysarum repens Miller Gard. Dict. ed. 8* (1768) (non *L.*). *H. adscendens Sw. Prodr.* 106 (1788) &

Fl. Ind. Occ. 1263. *Meibomia adscendens* Kuntze *Rev. Gen. Pl. i.* 195 (1891).

In fl. May; Wright! Broughton! Catherine's Peak, Macfadyen! Hope-well, St. Maarten, McNab! Wilson! Claverty Cottage, J.P. 1446, Hart! Port Antonio, Hitchcock.—West Indies, tropical continental America.

Branches to about 1 ft. high, pubescent, or minutely puberulous, with spreading hairs, or glabrate. Leaflets elliptical, broadly elliptical, or obovate-elliptical, puberulous with adpressed hairs, but few on the upper surface; stipules persistent, lanceolate, acuminate. Racemes long, 1-2 dm. l., terminal, laxly flowered. Bracts ovate, acuminate, soon falling. Pedicels usually 2 together, .5-1 cm. l. Calyx puberulous, 2.5 mm. l. Corolla about twice as long as the calyx; standard purple marked with 2 whitish spots near the base. Uppermost stamen free. Pod straight, lower margin wavy to the middle, puberulous with minute hooked hairs.

2. *D. supinum* DC. *Prodri. ii.* 332 (1825); stem suberect or lecumbent; leaflets 3, oblong-elliptical, whitish beneath; stipules united halfway, at length free; flowers in lax racemes; upper

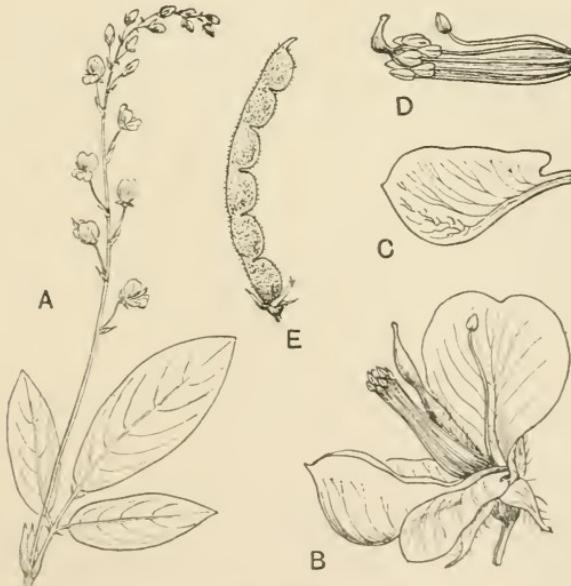


Fig. 10.—*Desmodium supinum* DC.

A, Portion of flowering branch $\times \frac{2}{3}$.
B, Flower $\times 5$.
C, Wing $\times 5$.

D, Stamens and pistil $\times 7$.
E, Pod $\times \frac{3}{2}$.

margin of pod continuous; joints 5-7, semielliptical to semi-circular, about 4 mm. l.—*Urb. loc. cit.* *D. incanum* DC. *loc. cit.*; *Benth. tom. cit.* 98; *Griseb. loc. cit.* *Onobrychis americana* &c. *Pluk. Phyt. t. 308, f. 5 & Alm. 270.* *Hedysarum foliis ternatis* &c. *L. Hort. Cliff. 365.* *H. triphyllum fruticosum supinum* &c. *Sloane Cat. 73 & Hist. i. 185, t. 2.* *H. canescens L. Sp.*

Pl. 748 (1753) (as far as regards Jamaica); *Miller Gard. Dict.* ed. 8. *H. supinum* *Sw. Prodr.* 106 (1788) & *Fl. Ind. Occ.* 1264. *H. incanum* *Sw. Prodr.* 107 (1788) & *Fl. Ind. Occ.* 1265. *Meibomia supina* *Britton in Ann. N. York Acad. Sci.* vii. 83 (1892). (Fig. 10.)

Common in pastures and by roadsides; in fl. throughout the year; *Sloane Herb.* iii. 88! *Houstoun!* *Distin!* *March!* King's House, J.P. 1320; *Claverty Cottage*, J.P. 1422; *Hart!* J.P. 2114, *Morris!* *Robertsfield*, *Campbell!* *Spring Garden*, *Mrs. Espeut!* *Arcadia*, *Mrs. Sewell!* *Yallahs Valley*, 2500 ft.; *Plato Road*, 2800 ft.; *Lititz savanna*, 300-900 ft.; *Harris!* *Ward's Rock*, 700 ft., *Thompson!* *Bethlehem*, St. Elizabeth, *T. Harris!* *Kingston*, *Constant Spring*, *Bog Walk*, *Port Morant*, *Hitchcock*; *Port Antonio*, *Rothrock*; *Porus*, *Lloyd*; *Fl. Jam.* 6537, 6647, 8001, 11,759. *Gully Road*, St. Ann, *Britton*, 2563!—*Florida*, *Bahamas*, *West Indies*, *Yucatan*, *Guiana*, *Brazil*; also in *Africa*.

Stems sometimes decumbent at the base and creeping, but more often with numerous branches from a suberect woody base, pubescent sparingly or more or less densely. Leaflets oblong-elliptical, elliptical, or lanceolate, pubescent or glabrate on the upper surface, pubescent beneath, 1·5-7 cm. l.; stipules lanceolate, persistent, 4-8 mm. l. Racemes terminal, many-flowered, to 1·5 dm. l. Bracts linear-lanceolate, 3-4 mm. l., deciduous. Calyx 2-3 mm. l. Corolla about ·5 cm. l., pink or bluish-purple. Pod with small hooked hairs, slightly curved, lower margin indented to the middle.

3. *D. intortum* comb. nov.; stem 3-cornered, angles with hooked hairs; leaflets 3; flowers in long lax racemes, terminal and axillary; upper margin of pod slightly notched; joints 10-3, rhomboid-elliptical, 3-3·5 mm. l.—*D. uncinatum DC. Prodr.* ii. 331 (1825); *Benth. tom. cit.* 96; *Griseb. op. cit.* 187. *D. trigonum DC. tom. cit.* 332 (1825); *Macf. Jam. i.* 269. *Hedysarum triphyllum maximum &c. Browne Hist. Jam.* 301 (1756). *H. intortum Miller Gard. Dict. ed. 8* (1768). *H. uncinatum Jacq. Hort. Schœnbr.* iii. 27, t. 298 (1798). *H. trigonum Sw. Prodr.* 107 (1788) & *Fl. Ind. Occ.* 1267. *Meibomia uncinata Kuntze tom. cit.* 197 (1891). Type in *Herb. Mus. Brit.* (specimen from *Houstoun* in *Herb. Miller*).

In fl. Jan.-April; *Lane* in *Herb. Sloane* clxii. 77! *Houstoun!* *Hope River*, *Browne*; *Liguanea*, *Broughton!* lower mountains, St. Andrew, *Macfadyen*; *Port Royal Mts.*, *McNab!* *A. W. Lane!* *Wilson!* *Mt. Hybla*, *Watt!* *David's Hill*, 3000 ft., *Harris!* *Blue Mt. Peak*, *Hitchcock*; *Fl. Jam.* 6665.—Tropical continental America.

Stem trailing amongst bushes. Leaflets ovate to ovate-lanceolate, pilose with adpressed hairs, and also with short hooked hairs along the nerves on the upper side; petiole 3-cornered; stipules tapering from a broad, triangular, amplexicaul base, ciliate, 8 mm. l.; stipels linear-lanceolate, 4-5 mm. l. Racemes to 3 dm. l. Bracts ·6-1 cm. l., deciduous. Pedicels solitary or geminate, ·5-1 cm. l. Calyx 4-5 mm. l., glabrous. Corolla rosy-pink or purplish-blue, about 1 cm. l. Pod with small hooked hairs, curved, lower margin indented to or beyond the middle.

4. *D. axillare DC. Prodr.* ii. 333 (1825); stem prostrate, creeping, rooting at the nodes, pubescent; branches procumbent or ascending; leaflets 3; flowers in long-stalked lax racemes

from the lower axils or from axils at rooting nodes; upper margin of pod slightly notched; joints 2 (or 1), semiorbicircular, 7–9 mm. l.—*Benth. tom. cit.* 99; *Griseb. loc. cit.*; *Urb. tom. cit.* 291. *D. oblongifolium DC. tom. cit.* 332 (1825). *D. radicans Macf. Jam. i.* 269 (1837). *Hedysarum triphyllum majus repens scapis &c. Browne Hist. Jam.* 301. *H. axillare Sw. Prodr.* 107 (1788) & *Fl. Ind. Occ.* 1274. *Meibomia umbrosa Britton, Torr. Bot. Cl. Bull. xxxvii.* 353 (1910). Type in Herb. Mus. Brit.

In fl. summer months after rain; *Shakspear*! St. Andrew Mts., *Macfadyen*; *Distin*! *Wullschaegel*; *March*; *Moneague, Prior*! *Claverty Cottage*, J.P. 1430, *Hart*! *Scott's Hall*, 600 ft.; *Castleton Hill*, 1000 ft.; *Thompson*! *Hope grounds*; *Bethlehem St. Elizabeth*; *T. Harris*! *Bog Walk, Port Antonio, Hitchcock*; *Troy, Britton* 444; near *Newport, Britton* 3209. *Fl. Jam.* 6750, 8029, 8290.—West Indies, Costa Rica, Venezuela, Colombia, Guiana, Brazil, Peru, Chile.

Stem 1–1½ ft. *Leaflets* elliptical, lanceolate, rhomboid or roundish, generally glabrate on upper surface, sometimes puberulous on central nerve, pubescent and markedly net-veined beneath, 3–8 cm. l.; stipules as in *D. intortum*. *Racemes* 3–4 dm. l. *Bracts* very caducous, 4 mm. l. *Calyx* 2 mm. l. *Corolla* about 4 mm. l., purple-crimson; standard with two yellow spots near the base. *Pod* puberulous with minute hooked hairs, lower margin indented nearly to upper margin.

Meibomia umbrosa Britton appears to be identical with var. *acutifolium* *Urb.*, but an examination of a series of specimens shows that the characters given as diagnostic, namely, acute leaflets and villose stem, are not constant.

[*D. cajanifolium DC. Prodr. ii.* 331 (1825); erect puberulous shrub; leaflets 3; flowers in many-flowered panicles; upper margin of pod slightly notched; joints 6 (8–5) roundish-elliptical, 4–6 mm. l.—*Benth. tom. cit.* 100; *Griseb. loc. cit.* *Hedysarum cajanifolium H. B. & K. Nov. Gen. & Sp. vi.* 525, t. 598 (1824). *Meibomia cajanifolia Kuntze tom. cit.* 195 (1891).

Wilson!—St. Vincent, Trinidad, Central America, Colombia, Guiana, Bolivia, Peru. Grisebach says, “naturalized in Jamaica,” but we have seen no specimen except Wilson’s.

Shrub 8–10 ft. high. *Leaflets* oblong, narrowly elliptical to ovate, glaucous-pubescent beneath, 3–9 cm. l. *Calyx* 3 mm. l. *Corolla* blue, 8–9 mm. l. *Pod* straight or slightly curved, puberulous, lower margin indented nearly to upper margin.]

[*D. gangeticum DC. Prodr. ii.* 327 (1825); stem suberect; leaflet 1; flowers in lax racemes, sometimes paniculate; upper margin of pod slightly notched; joints 8–5, almost orbicular, 2 mm. l.—*Wight Ic. t.* 271; *Griseb. loc. cit.*; *Bak. in Hook. f. Fl. Br. Ind. ii.* 168. *Hedysarum gangeticum L. Sp. Pl.* 746 (1753). *Meibomia gangetica Kuntze tom. cit.* 196 (1891). Type in Herb. Linn.

Naturalized; *Wilson*! *Hope grounds, Harris*! *Bath, Harris & Britton*! *Fl. Jam.* 6775, 8126, 10,568, 12,137.—India, Malay isles, Philippines, China, tropical Africa.

Stem suberect, 1–4 ft. high, woody, pubescent. *Leaflet* elliptical,

glabrescent on the upper surface, 2-9(-15) cm. l. *Calyx* 1.5 mm. l. *Corolla* 3-4 mm. l., white. *Pod* curved, lower margin indented beyond the middle.]

5. *D. purpureum* *comb. nov.* (non *Hook. & Arn.*) ; stem erect, more or less hispid with long hairs and short hooked hairs ; leaflets 3 ; stipules semicordate, acuminate ; flowers in lax terminal and axillary racemes or panicles ; pod twisted, indented equally from both margins ; joints 6-2, net-veined, about 4 mm. l. —*D. tortuosum DC. Prodr. ii. 332 (1825)*; *Macf. Jam. i. 266* ; *Griseb. op. cit. 188* ; *Urb. tom. cit. 293*. *Hedysarum triphyllum* *fruticosum*, *flore &c. Sloane Cat. 73 & Hist. i. 184, t. 116, f. 2*. *H. caulescens &c. Browne Hist. Jam. 301*. *H. purpureum Miller Gard. Dict. ed. 8 (1768)*. *H. tortuosum Sw. Prodr. 107 (1788) & Fl. Ind. Occ. 1271*. *Meibomia purpurea Vail in Small Fl. S. E. U. States 639 (1903)*. Miller's specimen from Vera Cruz from Houstoun, on which he founded the species, is in Herb. Mus. Brit.

Common ; in fl. after rains in May and Oct.; *Sloane Herb. iii. 86*! *Houstoun*; *Macfadyen!* Liguanea, St. Andrew, *McNab!* *Wullschaegel*; Liguanea plain, *Campbell!* Plato road, 3500 ft.; Hope grounds; *Harris!* Ward's Rock, 700 ft.; Devon Pen, 300 ft.; *Thompson!* Fl. Jam, 5992, 6668, 6857, 7921, 7963, 8080.—Florida, West Indies as far south as Grenada, Central America, northern South America.

Stem 2-4 ft. high. *Leaflets* ovate-lanceolate, or narrowly elliptical, hispid, densely along the margins and sparingly on both surfaces and the nerves, 2-11 cm. l. *Pedicels* 2 or 3 together, much longer than the flowers, 1-1.5 cm. l. *Calyx* about 3 mm. l. *Corolla* of a pale azure or purplish colour, about 4 mm. l. *Pod* about 2 (1.5-2.3) cm. l., puberulous with minute hooked hairs.

6. *D. procumbens* *Hitchcock in Rep. Miss. Bot. Gard. iv. 76 (1893)*; stem procumbent and rooting at the base, then ascending, puberulous or glabrate, branches diffuse ; leaflets 3 (rarely 1); stipules broad at the base, setaceous ; flowers in long lax slender terminal racemes or panicles ; pod twisted permanently, indented equally from both margins ; joints 8-2, orbicular to rhomboid, net-veined, about 4 mm. l.—*D. spirale DC. Prodr. ii. 332 (1825)*; *Benth. tom. cit. 105*; *Macf. Jam. i. 271*; *Griseb. loc. cit.*; *Urb. loc. cit.* *Hedysarum procumbens, Miller loc. cit. (1768)*. *H. spirale Sw. Prodr. 107 (1788) & Fl. Ind. Occ. 1273*. *Meibomia spiralis Kuntze tom. cit. 197 (1891)*. Type in Herb. Mus. Brit.

In fl. towards the end of the year; *Lane* in Herb. Sloane clxii. 77! *Houstoun!* *Wright!* *Masson!* *Macfadyen!* *Distin!* Kingston, *Prior!* Hope grounds, *Harris!* Kingston, Lucea *Hitchcock*; Fl. Jam. 6637, 6964, 11,852.—West Indies, tropical continental America, tropical Africa, East Indies, Pacific Islands.

Stem 1-4 ft. in length, slender, spreading on the ground, or supported by shrubs. *Leaflets* variable, ovate, lanceolate, oblong, or elliptical, minutely hispidulous or glabrous, 1-3(-6) cm. l., sometimes with a light-greyish streak down the centre. *Racemes* or *panicles* 1-2.5 dm. l.

Pedicels 2 or 3 together, ·7-1 cm. l. *Flowers* very small, rosy or greenish-white tinged with purple. *Calyx* 1·5(-2·5) mm. l. *Corolla* about 3 mm. l. *Pod* 1-1·5 cm. l., puberulous with minute hooked hairs.

7. *D. scorpiurus* Desv. *Journ. Bot. i.* 122 (1813); stem very long, procumbent, rooting near the base, angular, pubescent; leaflets 3; stipules semicordate, acuminate; flowers in lax racemes opposite a leaf or axillary; pod indented slightly equally from both margins; joints 7-4, net-veined, linear-oblong, more than twice as long as broad, 4-5 mm. l.—*DC. Prodr. ii.* 333; *Macf. Jam. i.* 271; *Griseb. loc. cit.*; *Urb. tom. cit.* 293. *Hedysarum triphyllum hirsutum* &c. *Browne Hist. Jam.* 301. *H. scorpiurus Sw. Prodr.* 107 (1788) &^{*}*Fl. Ind. Occ.* 1269. *Meibomia scorpiurus Kuntze tom. cit.* 198 (1891).

Common in pastures and by roadsides; in fl. Oct.-Jan.; *Sloane Herb. iii.* 86*! *Guys Hill, Browne*; *Bancroft*! *St. Andrew, Mts., Macfadyen*; *Distin*! *Golden Spring, 800 ft., Thompson*! *Port Antonio, Lucea, Hitchcock*; *Hope Gardens, Harris*! *Fl. Jam.* 8064, 11,854.—West Indies, Mexico to Peru.

Stems to 5 dm. and more. *Leaflets* roundish-elliptical or oblong-elliptical, pubescent or glabrate on the upper surface, more or less pubescent and glaucous beneath, 1-3(-5) cm. l. *Racemes* ·5-1·5 dm. l. *Calyx* 2·5-3 mm. l. *Corolla* pale rosy or whitish tinged with purple, 4·5 mm. l. *Pod* puberulous with minute hooked hairs.

8. *D. molle* DC. *Prodr. ii.* 332 (1825); stem erect, velvety-pubescent with some hairs hooked; leaflets 3; stipules semi-cordate, acuminate; flowers in terminal and axillary racemes or panicles; pod twisted, net-veined, of 2 joints only, the terminal one fertile, the other sterile (occasionally both sterile); fertile joint orbicular or elliptical, emarginate on one side, 6-7 mm. l.—*Macf. Jam. i.* 267; *Benth. tom. cit.* 104; *Griseb. loc. cit.*; *Urb. tom. cit.* 292. *Hedysarum molle Vahl Symb. ii.* 83 (1791). *Meibomia mollis Kuntze tom. cit.* 198 (1891).

"In fl. end of year; common weed in the cane pieces of Guanaboa, St. John." *Macfadyen*.—Hispaniola, Mona, Porto Rico, St. Thomas, St. Cruz, Martinique, Curaçao, Central America, Colombia, Brazil, Guiana. We have not seen any specimen from Jamaica.

Stem somewhat shrubby, 2-3 ft. high or more. *Leaflets* ovate, ovate-triangular to lanceolate, soft and velvety to the touch on both sides with minute adpressed hairs, ciliate, 2-8 cm. l. *Racemes* or *panicles* 1-3 dm. l. *Pedicels* generally 3 together, longer than the flowers, ·5-·7 cm. l. *Flowers* very small, purplish. *Calyx* about 2 mm. l. *Corolla* about 3 mm. l. *Pod* puberulous.

[*D. gyrans* DC. *Prodr. ii.* 326 (1825); leaflets 3; lateral very small in comparison with the terminal leaflet and moving by jerks (sometimes wanting); upper margin of pod continuous, lower indented, indistinctly 6-10-jointed, dehiscing in a continuous line along the lower margin.—*Wight Ic. t.* 294; *Bak.*

tom. cit. 174. *Hedysarum gyrans* Linn. *f. Suppl.* 332 (1781).
Meibomia gyrans Kuntze *tom. cit.* 196 (1891).

Naturalized; Mt. James, 1000 ft.; Plato Road, 3500 ft.; Temple Hall, St. Andrew, 600 ft.; Harris! Castleton Road, 600 ft., Thompson! Fl. Jam. 5811, 6644, 8078, 12,133. Native of East Indies, Malay isles, Philippines.

Herbaceous or shrubby, 1-4 ft. high; branches subterete. Leaflets 1-3, oblong-lanceolate; terminal leaflet, 5-7 cm. l., sometimes longer; lateral leaflets 1 to nearly 2 cm. l. Racemes and panicles axillary and terminal. Flowers hidden at first by the large ovate deciduous bracts. Calyx 2 mm. l. Corolla about 6 mm. l., yellow; standard veined with violet. Pod 2·5-4 cm. l., curved, puberulous or glabrescent.]

9. *D. triflorum* DC. *Prodr. ii.* 334 (1825); stem much branched, prostrate or creeping, slender, more or less pubescent; leaflets 3, small, obovate or obcordate, 4-8 mm. l.; flowers in clusters of 2-4, opposite a leaf; upper margin of pod continuous; joints 3-6, somewhat square, net-veined, tardily dehiscent, 3-3·5 mm. l.—Benth. *tom. cit.* 95, t. 26, f. I.; Macf. *Jam. i.* 272; Wight *Ic. t.* 292; Griseb. *op. cit.* 186; Urb. *tom. cit.* 289. *Hedysarum triflorum* L. *Sp. Pl.* 749 (1753); *Sw. Obs.* 288, t. 6, f. 1. *Meibomia triflora* Kuntze *tom. cit.* 197 (1891). Type in Herb. Hermann in Herb. Mus. Brit.

By roadsides, in pastures and in cane-piece intervals; in fl. Nov.; Morant Bay, Broughton! Macfadyen! Prior; Hope grounds, Fawcett! also Harris! Golden Spring, Thompson! Constant Spring, Port Antonio, Lucea, Hitchcock; in pastures, Tyre, near Troy, 2000 ft.; Harris! Fl. Jam. 6798, 7473, 8052, 9084.—Florida, West Indies, tropical continental America, tropical Africa, south-east Asia.

Stipules persistent. Calyx pilose, 2-3 mm. l., segments lanceolate, the two upper united to the middle. Corolla red to purple; standard long-clawed, 4 mm. l. Uppermost stamen free or united only at the base. Pod 1-1·5 cm. l., lower margin indented.

10. *D. barbatum* Benth. in *Miq. Pl. Jungh.* 224 (1852); stem erect or procumbent with ascending branches, pubescent or villose; leaflets 3; flowers nodding, crowded in dense corymbose terminal racemes, 2 under each large scarious bract, with hirsute calyx; pod reflexed, upper margin continuous; joints 2-4, somewhat rhomboidal, transversely veined, tardily dehiscent, 3 mm. l.—Benth. *loc. cit.* 95, t. 26, f. II.; Griseb. *loc. cit.*; Urb. *tom. cit.* 290. *Hedysarum barbatum* L. *Syst. ed.* 10, 1170 (1759), *Amen. v.* 403 & *Sp. Pl. ed.* 2, 1055; *Sw. Obs. Bot.* 287. H. villosum Miller *Gard. Dict. ed.* 8 (1768). *Nicolsonia barbata* DC. *Prodr. ii.* 325 (1825); Macf. *Jam. i.* 264. *Meibomia barbata* Kuntze *tom. cit.* 195 (1891).

Clarendon Mts., Broughton! Macfadyen; St. Ann, Purdie! Wilson! Westphalia, J.P. 1477, Campbell! St. George, 2500 ft.; Mt. Hybla, 3500 ft.; Savanna, Upper Clarendon, 2500 ft.; Harris! Spanish River, seven miles from Buff Bay, Moore!—West Indies, tropical continental America.

Plant low-growing to 2 ft. Leaflets, terminal oblong-elliptical, 1·3-3 cm. l., lateral a little smaller; stipules persistent. Racemes 1·5-3 cm. l. Bracts hirsute. Calyx 4 mm. l. Corolla shorter than the

calyx, rosy, blue or whitish; standard long-clawed. Uppermost stamen free or cohering only at the base. Pod 7-1·3 cm. l., lower margin indented.

[*D. umbellatum DC. Prodr. ii. 325 (1825)*; shrub with terete branches; leaflets 3; flowers in dense shortly-stalked or sessile axillary umbels; pod with style persistent, upper margin slightly notched; joints 5-1, elliptical, 7-10 mm. l.—*Bak. tom. cit. 161. Hedysarum umbellatum L. Sp. Pl. 747 (1753); Jacq. Hort. Schoenbr. t. 297. Dendrolobium umbellatum Benth. in Miq. Pl. Jungh. 218 (1852); Griseb. op. cit. 188. Meibomia umbellata Kuntze tom. cit. 197 (1891).* Type in Herb. Hermann in Herb. Mus. Brit.

March!—Native of East Indies, Mascarene isles, Malaya, Philippines, Polynesia.

Shrub 5-6 ft. high, rather showy; branches, when young, densely downy. Leaflets elliptical to roundish, 5-8 cm. l. Calyx 4-5 mm. l. Corolla 1-1·2 cm. l. Pod 4-5 cm. l., lower margin indented to the middle, silky or glabrescent. Naturalized according to Grisebach, but we have not seen any specimen from Jamaica, except March's in Herb. Kew.]

[*D. Cephalotes Wall. Cat. n. 5721 (nomen); Wight & Arn. Prodr. 224 (1834)*; shrub with 3-angled villose branches; leaflets 3; flowers in dense shortly stalked axillary umbels; pod shortly beaked, upper margin slightly notched; joints 2-5, somewhat square or elliptical, 4 mm. l.—*Wight Ic. t. 373; Bak. tom. cit. 161. Hedysarum Cephalotes Roxb. Fl. Ind. iii. 360 (1832). Meibomia Cephalotes Kuntze tom. cit. 195 (1891).*

Introduced; above Gordon Town, 1200 ft., *Harris! Fl. Jam. 7889*.—East Indies, Malaya, Siam, China.

A straggling shrub, 3 to 4 ft. high. Leaflets narrowly elliptical to lanceolate, subacuminate, 5-12 cm. l. Calyx 4-4·5 mm. l. Corolla deep red, 7-8 mm. l. Pod 8-1·5 cm. l., silky or glabrescent.]

[*D. triquetrum DC. Prodr. ii. 326 (1825)*; leaflet single; petiole winged.—*Bak. tom. cit. 163. Hedysarum triquetrum L. Sp. Pl. 746 (1753). Meibomia triquetra Kuntze tom. cit. 197 (1891).* Type in Herb. Hermann in Herb. Mus. Brit.

In fl. at end of year; naturalized; Mt. Airy, 3000 ft.; between Mt. Airy and Brandon Hill, 1000 ft. (growing on trees); *Harris! Prospect Hill, 2000 ft.; Thompson! Fl. Jam. 6373, 7460, 7957*.—Native of East Indies, China, Philippines.

Shrub 3-4 ft. high; branches more or less triquetrous. Leaflets lanceolate or ovate, 5-2 dm. l. Racemes terminal and axillary, 1·5-3 dm. l. Flowers pink. Calyx 3 mm. l. Corolla about 5 mm. l. Pod thin, indehiscent, splitting into joints, 2·5-3 cm. l., 5-7 mm. br.; joints 6-8, nearly square.]

[LOUREA Neck.

Leaves 3-foliolate (reduced usually to a single 2-lobed leaflet in *L. vespertilionis Desv.*). Racemes terminal. Calyx 5-fid, at

length inflated. Standard obovate; narrowed into a claw. Uppermost stamen free, the rest united. Pod constricted between the seeds; joints 4-5, compressed, folded back on each other, and hidden within the enlarged calyx.

Species 4, growing within the tropics in Asia and Australia.

L. vespertilionis Desv. *Journ. Bot.* i. 122, t. 5, f. 18 (1813); Wight *Ic.* t. 285. *Hedysarum vespertilionis* Linn. *f. Suppl.* 331 (1781); *Lour. Fl. Coch.* 447; *Jacq. Ic. Pl. Rar. iii.* t. 566; *Griseb. Fl. Br. W. Ind.* 185; *Bak. in Hook. f. Fl. Br. Ind.* ii. 154. Founded by Linnæus fil. on a specimen sent by Father Joannes de Loureyro from Cochin China in 1774. There is a specimen from Loureyro of the same date in Herb. Banks in Herb. Mus. Brit.

Naturalized; in fl. May-Sept.; "near Botanic Gardens, Port Royal Mts." (collector not named, in Herb. Kew.); Purdie! Providence Road, 700 ft.; Temple Hall, 800 ft.; Thompson! Constant Spring, Hitchcock; Castleton District, 500 ft.; Mona, 800 ft.; Constant Spring to Bardowie, 800 ft.; Harris! Fl. Jam. 6744, 7402, 8008, 8941, 12,108.—Naturalized in St. Kitts, Martinique, St. Vincent, Trinidad, native of East Indies.

Stem 2-3 ft. high, erect, slender. Leaves thin, somewhat leathery, generally 1-foliolate, rarely 3-foliolate; leaflet with 2 narrowly lanceolate blunt spreading 2-3-nerved halves, 3-8 cm. in breadth from tip to tip, 5-1.5 cm. l.; lateral leaflets, if present, much smaller, obliquely obversely deltoid. Calyx finally 6-9 mm. l. Corolla a little longer than the calyx, yellow or white. Pod, joints 3 mm. l.]

[*ALYSICARPUS* Neck.

Leaves 1-foliolate. Stipules dry, enclosing 2 stipels. Flowers small, in terminal, and sometimes also in axillary, racemes. Calyx 5-fid, segments long, narrow, dry, rigid. Corolla included. Standard obovate or roundish, clawed. Uppermost stamen free, the rest united. Pod cylindrical or only slightly compressed; joints several, thick.

Species 16, growing within the tropics in Asia, Africa, and Australia, one also naturalized in tropical America.

A. vaginalis DC. *Prodri.* ii. 353 (1825); *Griseb. Fl. Br. W. Ind.* 185; *Bak. in Hook. f. Fl. Br. Ind.* ii. 158. *A. nummularifolius* DC. loc. cit.; *Urb. Symb. Ant.* iv. 294. *Hedysarum foliis simplicibus cordato-oblongis, petiolis simplicibus, stipulis vaginantibus* L. *Fl. Zeyl.* 133. *H. vaginalis* L. *Sp. Pl.* 746 (1753). Type in Herb. Hermann in Herb. Mus. Brit. As pointed out by Trimen in Flora of Ceylon (ii. 44) *Hedysarum nummularifolium* L. (*Sp. Pl.* 746) has been generally regarded as a synonym of this species, but the description, as well as the type

in Hermann's Herb., show it to be *Indigofera echinata* Willd. This has been overlooked by Urban in Symb. Ant., where the above species is cited as *A. nummularifolius*.

In fl. Oct.-March; coast of Trelawney, Purdie! Hope grounds; King's House grounds; Cokely, near Castleton, 600 ft.; Harris! Golden Valley, 500 ft.; Thompson! Constant Spring, Bog Walk, Port Morant, Hitchcock; Fl. Jam. 6808, 6954, 8050, 12,159.—Naturalized in West Indies and Guiana; native in tropics of Old World.

Stems creeping, with ascending branches 1-3 ft. l. *Leaflets* of different forms often on the same plant, generally elliptical or round, sometimes oblong or lanceolate, base cordate, 3 mm.-4 cm. l. *Racemes* with 6-12 flowers, generally crowded. *Calyx* 5 mm. l. *Corolla* rosy or pale purple. *Pod* wrinkled, 1-2 cm. l.; joints 5-7, 2-2.5 mm. l. *Seeds* about 1 mm. l.]

§ 5. Low-growing herbs. Leaves abruptly pinnate, without stipels. Flowers, 1, or more, crowded in the lower axils. Stamens 10 (or 9), all united into a closed sheath. Pod burying itself in the earth, not splitting open.

[ARACHIS L.]

Leaves with 2 pairs of leaflets. Stipules adherent to the leaf-stalk. Calyx, tube very long, stalk-like, 4 upper lobes united, lowest distinct, narrow. Standard roundish. Anthers alternately long, subbasifixed and short, versatile. Pod somewhat constricted between the seeds, but not jointed, continuous within. Seeds 1-3.

Species 9, of which 8 are Brazilian, and 1 (*A. hypogaea*) of uncertain origin, cultivated throughout the tropics.

A. hypogaea L. Sp. Pl. 741 (1753); Wright Mem. 189; Macf. Jam. i. 322; Benth. in Fl. Bras. xv. pt. 1, 86, t. 23, f. 1; Griseb. Fl. Br. W. Ind. 189; Bentl. & Trim. Med. Pl. t. 75; Urb. Symb. Ant. iv. 289. Arachidna indiae &c. Sloane Cat. 72 & Hist. i. 184. Sena tetraphylla &c. Pluk. Phyt. t. 60, f. 2 & Alm. 341.

Ground Nut, Earth Nut, Pea Nut, Monkey Nut.

Cult. Sloane Herb. iii. 85! Wright! Macfadyen.—Cultivated in the tropics, probably native of Brazil.

Annual, with spreading hairs on branches and petioles. Stem thick, erect, often 1 ft. high; branches shortly prostrate then ascending. Leaflets obovate or broadly oblong, apex rounded with a minute mucro, ciliate with a few hairs, glabrous on upper surface, pubescent or glabrescent beneath, 2.5-5 cm. l.; petiole 5-7 cm. l. Calyx: tube 2-4 cm. l., limb about .5 cm. l. Corolla golden yellow; standard about 1 cm. l. Pod (an inch or more below the ground) at the end of a stiff stalk, 5-7 cm. l., which has grown beneath the ovary after the fall of the flower, 2-4 cm. l. Seeds edible, rich in oil.]

[§ 6. Climbing herbs. Leaves abruptly pinnate ending in a tendril; leaflets without stipels. Stipules semisagittate. Flowers subsessile, 1 or 2 together in the axils. Stamens 10, uppermost free or more or less united with the sheath. Pod 2-valved.

VICIA L.

Leaflets in several pairs. Calyx with 5 segments. Standard obovate, emarginate with a broad claw. Mouth of the staminal sheath oblique. Style thread-like, with a bunch of hairs at the apex. Pod compressed, continuous within. Seeds globular, with a small aril.

Species 120, widely dispersed through the temperate regions of the northern hemisphere and of South America.

V. sativa L. *Sp. Pl.* 736 (1753); *Macf. Jam. i.* 272; *Griseb. Fl. Br. W. Ind.* 189. Type in *Herb. Linn.*

Vetch.

Naturalized; *Macfadyen*; *March*! Clifton Mount; Mt. Hybla, 3600 ft.; *Harris*! Fl. Jam. 10,802.—Native of Europe, widely cultivated and naturalized throughout the world.

Annual. Leaflets in 5-7 pairs, oblong-linear, apex truncate, mucronate. Flowers dark rose or purple, with very short stalks, 1-2 in the axils. Calyx-segments equal, about as long as the tube, lanceolate, acuminate. Corolla about 2 cm. l. Pod glabrate, linear, about 5 cm. l.

Lathyrus tingitanus L., the Tangier Pea, has been collected in the Blue Mts., but it is probably an escape from a garden. It is an annual with a winged stem, a single pair of leaflets with a branched tendril, and flowers purple, about an inch long, 2 or 3 in a raceme.]

§ 7. Shrubs with twining branches. Leaves abruptly pinnate, with the end of the petiole produced bristle-like; leaflets without stipels. Flowers in clusters along axillary and terminal racemes. Stamens 9, united into a sheath split above. Pod 2-valved.

11. ABRUS Adans.

Leaflets in numerous pairs. Calyx truncate, teeth very short. Standard elliptical-ovate, with a short broad claw. Style glabrous. Pod compressed, with transverse membranous partitions between the seeds.

Species 6, natives of the tropics.

A. precatorius L. *Syst. ed. 12*, 472 (1767); *Wright Mem.* 213, 293; *Macf. Jam. i.* 274; *Griseb. Fl. Br. W. Ind.* 190; *Bak. in Hook. f. Fl. Br. Ind. ii.* 175; *Bentl. & Trim. Med. Pl. t. 77*; *Urb.*

Symb. Ant. iv. 298. *Phaseolus glycyrrhizites* &c. *Sloane Cat.* 70 & *Hist. i.* 180, *t.* 112, *f.* 4, 5, 6. *P. arborescens alatus* &c. *Pluk. Phyt.* *t.* 214, *f.* 5, 6 & *Alm.* 294. *Glycine foliis pinnatis conjugatis* &c. *L. Flor. Zeyl.* 130. *G. Abrus L. Sp. Pl.* 753 (1753) & *ed.* 2, 1025. *G. scandens* &c. *Browne Hist. Jam.* 297. (Fig. 11.) Type in Herb. Hermann in Herb. Mus. Brit.

Wild Liquorice, Red Bead Vine, Crab's Eyes.

Common at low elevations; in fl. Oct., Nov.; *Sloane Herb.* iii. 71, 72! *Houstoun!* *Broughton!* *Macfadyen;* *Wullschlaegel;* *Prior;* Long Mt.,

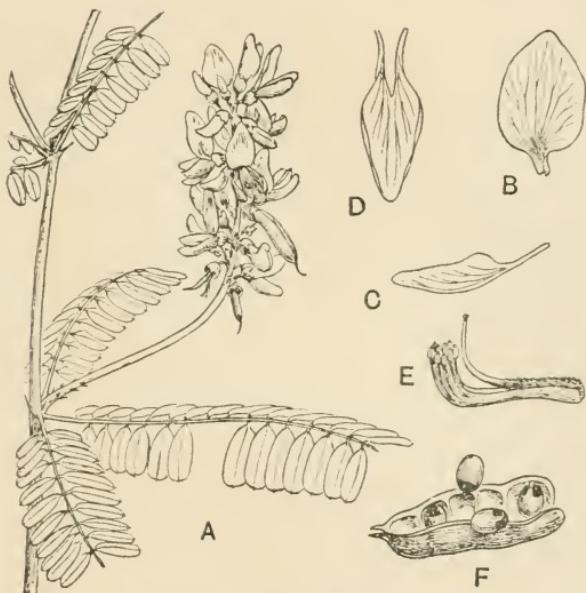


Fig. 11.—*Abrus precatorius* L.

A, Leaves and raceme $\times \frac{1}{2}$.

D, Keel $\times \frac{1}{2}$.

B, Standard $\times \frac{1}{2}$.

E, Stamens and pistil $\times \frac{1}{2}$.

C, Wing $\times \frac{1}{2}$.

F, Pod and seeds $\times \frac{1}{2}$.

(After Bentley & Trimen.)

west, near Kingston, *Harris!* Constant Spring, Port Morant, Lucea, *Hitchcock*; Hope grounds; Halfway Tree; *Miss Wood!*—Tropics.

A climbing shrub; branches many, twining. Leaves 6–13 cm. l.; leaflets in 10–20 pairs, lingulate-oblong, deciduous, 1–2 cm. l. Racemes short, crowded, many-flowered. Calyx 2–4 mm. l. Corolla flesh-coloured, 9–12 cm. l. Pod oblong, somewhat rectangular, 3–5-seeded, to 4 cm. l. Seeds bright scarlet with a black spot (or black, or whitish or mixed black and white).

The roots are used as a substitute for liquorice. The leaves have a sweet taste, and are made into tea for coughs and pleurisies (Wright). The seeds are principally employed, strung like beads, to form necklaces and rosaries; and it is, from their being employed for the latter purpose, that the plant has received its specific designation (Macfadyen). They are used by goldsmiths in India as weights.

§ 8. Herbs or shrubs, twining, or sometimes erect, rarely prostrate, or becoming trees in *Erythrina*. Leaves pinnately 3-foliolate (5–7-foliolate in *Clitoria Ternatea*) ; leaflets with stipels. Flowers in axillary racemes, often 2 or more in clusters along the rhachis of the raceme, peduncles 1–3-flowered in *Clitoria*, flowers often 1–few in axils in *Teramnus* and *Galactia uniflora*. Stamens 10, all united into a sheath or the uppermost more or less free. Pod 2-valved.

12. CENTROSEMA Benth.

Stem climbing with twining branches (in W. Indian species). Leaves 3-foliolate (in Jamaican species), sometimes reduced to one leaflet. Peduncles axillary, solitary or geminate, with one to numerous flowers. Bracteoles adpressed to the calyx, longer than the calyx or nearly as long. Calyx campanulate or funnel-shaped ; segments very short, or longer than the tube, or only the lowest longer than the tube. Standard large, broadly roundish, flattened, spurred or slightly gibbous above the short claw. Style dilated at the apex. Pod flat-compressed, with a long beak, and partitions between the seeds ; valves ribbed near both margins.

Species 30, natives of the West Indies and Central and S. America, one (*C. virginianum*) also in southern N. America and naturalized in Java.

- | | |
|---|----------------------------|
| Leaves broadly ovate. Bracteoles 2 or 3 times as long as the calyx. Pod nearly 1 cm. in diam.; ribs 3 mm. from margin | 1. <i>C. Plumieri</i> . |
| Leaves narrowly ovate or oblong. Bracteoles equal to, or shorter than, the calyx. Pod 4–6 mm. in diam.; ribs close to the margin. | |
| Leaflets soft and velvety. Calyx-segments unequal | 2. <i>C. pubescens</i> . |
| Leaflets glabrous. Calyx-segments subequal, linear-lanceolate | 3. <i>C. virginianum</i> . |

1. *C. Plumieri* Benth. *Comm. Legum. Gen.* 54 (1837) ; leaflets large, broadly ovate or elliptical, glabrous, 6–12 cm. l. ; bracteoles 2 or 3 times as long as the calyx ; segments of calyx unequal, short, uppermost very short or obsolete ; standard 4–5.5 cm. br. ; pod nearly 1 cm. in diam., with ribs about 3 mm. from the margin.—Benth. in *Ann. Wien. Mus.* ii. 118 & in *Fl. Bras.* xv. pt. 1, 127 ; Griseb. *Fl. Br. W. Ind.* 192 ; Urb. *Symb. Ant.* iv. 300. *Phaseolus ampio flore peltato* &c. *Plum. Descr. Pl. Amer.* t. 108 & *Ic. ined.* iv. t. 238. *Clitoria Plumieri* Turp. ex Pers. *Syn. ii.* 303 (1807) ; *Bot. Reg.* t. 268 ; *Rev. J. Lindsay Ic. ined.* ; *Macf. Jam.* i. 253.

Fee-fée.

In fl. and fr. Oct.-Jan.; Sloane Herb. iii. 73 (pods only)! Barham in Herb. Sloane clxii. 269! Houston! common in Wythiwood, Lindsay; Broughton! Distin; Purdie; Wullschaegel; Wilson; Bog Walk, Port Morant, Lucea, Hitchcock; Hope; near Castleton; Harris!—West Indies, tropical continental America.

Peduncles few (2-6)-flowered, 3-7 cm. l. Bracteoles ovate-elliptical, about 1.5 cm. l. Calyx about .5 cm. l. Corolla, standard sparsely puberulous outside, white stained with crimson and deep bright purple; wings white, stained with purple towards the apex. Pod 12-15 cm. l.

2. *C. pubescens* Benth. *Comm. Legum. Gen.* 55 (1837); leaflets elliptical or oblong, apex often very shortly acuminate,

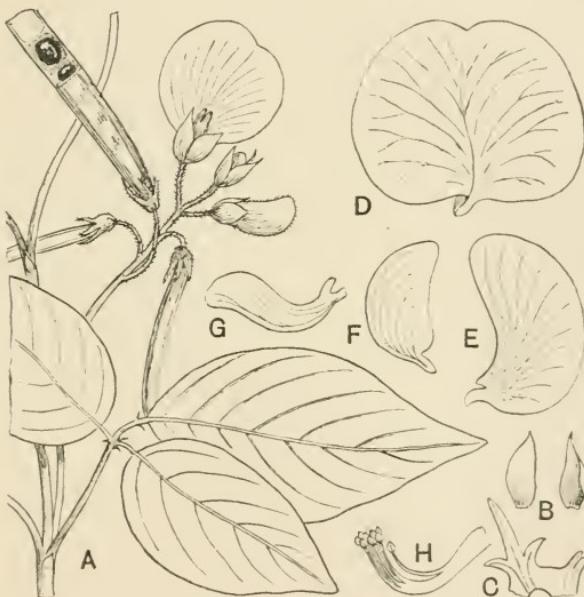


Fig. 12.—*Centrosema pubescens* Benth.

A, Portion of branch showing leaf, flowers, and part of pod, $\times \frac{1}{2}$.

B, Bracteoles slightly magnified.

C, Calyx cut open, nat. size.

D, Standard $\times \frac{2}{3}$.

E, Standard, side view, folded, $\times \frac{2}{3}$.

F, Keel $\times \frac{2}{3}$.

G, Wing $\times \frac{2}{3}$.

H, Stamens $\times \frac{2}{3}$.

(After Benth.)

obtuse, soft and velvety to the touch on both sides, later glabrate, 3.5-7 cm. l.; bracteoles somewhat shorter than the calyx; the uppermost segment of the calyx distant and shortly 2-toothed, about equalling the tube, the lowest linear and much longer than the tube; standard 4 cm. br.; pod 6 mm. in diam. with ribs close to and forming part of the margin.—Benth. in *Ann. Wien. Mus.* ii. 119 (1838) & in *Fl. Bras.* xv. pt. 1, 131, t. 34, f. II.; Griseb. loc. cit.; Urb. loc. cit. C. molle Mart. ms. ex Benth.

Comm. Legum. Gen. 55. *Clitoria virginiana Sw. Obs.* 282 (non L.) ; *Macf. Jam.* i. 252. (Fig. 12.)

In fl. and fr. Nov.-Jan.; *Broughton!* *Macfadyen!* *Prior!* *March!* Hope grounds, *Miss Wood!* also *Harris!* Constant Spring, Port Morant, *Hitchcock*.—West Indies, tropical continental America.

Peduncles several-flowered, 4-7 cm. l. Bracteoles ovate-elliptical, about .8 cm. l. Flowers pale lavender and white. Calyx (incl. lowest segment) 1·1-1·2 cm. l. Standard spurred, densely puberulous outside. Pod 8-10 cm. l.

3. *C. virginianum* *Benth.* *Comm. Legum. Gen.* 56 (1837); leaflets narrowly ovate, oblong, or linear-lanceolate, glabrous, 2-7 cm. l.; bracteoles shorter than the calyx; segments of calyx very long, linear-lanceolate, subequal, distant; standard 3 cm. br.; pod 4 mm. in diam. with ribs close to and forming part of the margin.—*Benth. in Ann. Wien. Mus.* ii. 120 & in *Fl. Bras.* xv. pt. 1, 132; *Griseb. op. cit.* 193; *Urb. loc. cit.* *Phaseolus sylvaticus* &c. *Sloane Cat.* 71 & *Hist.* i. 181. *Clitorius trifolius* flore minore caeruleo *Dill. Elth.* 90, t. 76. *Clitoria foliis ternatis calycibus campanulatis* *Gron. Virg.* 83. *C. virginiana* *L. Sp. Pl.* 753 (1753). *C. calcarigera* *Salisb. Parad. Lond.* t. 51 (1806). *Bradburya virginiana* *Kuntze Rev. Gen. Pl.* i. 164 (1891). The type, Clayton's specimen in Herb. Gronovius, is in Herb. Mus. Brit.

In fl. and fr. Oct.-Feb.; *Sloane* *Herb.* iii. 73, 74! *Lane* in *Herb. Sloane* clxii. 80! *De Ponthieu!* *Distin!* *Cuming!* Pedro plain, *Purdie!* Gordon Town, *Ball!* Constant Spring, *Campbell!* also *Hitchcock*; *Porus, Lloyd*; above Gordon Town, 1000 ft.; Hope grounds, 700 ft.; *Harris!*—Bermuda, Bahamas, West Indies, continental America from the southern United States to Argentina, western tropical Africa.

Peduncles solitary or 2-3 together, 3-1-flowered, 1-2·5(-5) cm. l. Bracteoles ovate, .6-1 cm. l. Flowers lavender-blue or white turning pale blue. Calyx .8-1·2 cm. l.; tube short, about 2 mm. l.; teeth .6-1 cm. l. Standard spurred, sparsely puberulous outside. Pod 8-12 cm. l.

13. CLITORIA L.

Herbs or shrubs with twining stems (in Jamaican species). Bracteoles large, ribbed, persistent, less than half as long as the calyx. Calyx campanulate-tubular, with 5 segments or teeth. Standard large, emarginate-roundish at the apex, narrowed at the base. Style more or less horizontally dilated at the apex, and with a row of hairs on the inner face. Pod compressed, without ribs (*C. Ternatea*), or with a rib near the middle (*C. rubiginosa*).

Species 30, natives of the tropics.

- | | |
|--|---------------------------|
| Leaflets 5-7. Flowers blue..... | 1. <i>C. Ternatea</i> . |
| Leaflets 3. Flowers white, streaked..... | 2. <i>C. rubiginosa</i> . |

1. *C. Ternatea* *L. Sp. Pl.* 753 (1753); leaflets in 2-3 (4-5) pairs; pod without ribs.—*Bot. Mag.* t. 1542; *Benth. in Journ.*

Proc. Linn. Soc. ii. 33 & in Fl. Bras. xv. pt. 1, 118, t. 31, f. I.; Griseb. Fl. Br. W. Ind. 192; Urb. Symb. Ant. iv. 299. (Fig. 13.) Type in Herb. Linn. and in Herb. Hermann in Herb. Mus. Brit.

Canefields, St. Andrew, McNab! Hope Gardens; near Runaway Bay; Harris! Halfway Tree, Miss Wood! Fl. Jam. 10,370; Kingston, Hitchcock.—Florida (naturalized), Bahamas, West Indies, Panama, tropical eastern S. America, tropical Africa.

Stem twining, puberulous. Leaflets elliptical or ovate, glabrous, 2–5 cm. l. Peduncles one-flowered, very short, 3–8 mm. l. Bracteoles roundish, less than half as long as the calyx, 6–8 mm. l. Flowers blue, rarely white. Calyx 1·5–2 cm. l. Standard 4–5 cm. l. Pod, valves flat

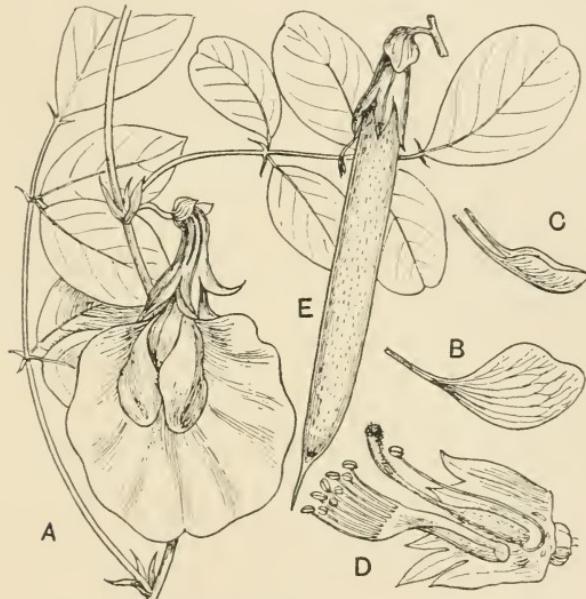


Fig. 13.—*Clitoria Ternata* L.

- | | |
|---|--|
| A, Portion of branch with leaves and
flower $\times \frac{2}{3}$. | C, Keel $\times \frac{2}{3}$. |
| B, Wing $\times \frac{2}{3}$. | D, Calyx, stamens and pistil, nat. size. |
| E, Pod $\times \frac{2}{3}$. | |

or slightly convex, beaked, pubescent, 6–11 cm. l. Seeds roundish-ellipsoidal, compressed, smooth. In cultivation the flower often becomes double.

The powdered seeds (30 to 60 grains) are purgative and aperient, and have gained a certain reputation in Europe as a safe medicine, especially for children (Watt). Species of *Clitoria* have been used as cover crops to protect the soil from wash on sloping ground.

2. *C. rubiginosa* Juss. ex Pers. *Syn. ii. 303* (1807); leaflets 3; pod with a rib near the middle.—*Urb. loc. cit.* *C. glycinoides DC. Prodr. ii. 234* (1825); *Macf. Jam. i. 253*; *Griseb. loc. cit.*; *Benth. in Journ. Proc. Linn. Soc. ii. 39* & in *Fl. Bras. loc. cit.*

In fl. May-Oct.; Wright! Savanna la Mar, Distin! Guys Hill, St. Thomas in the Vale, McNab! also Purdie; road to Dolphin Peak, 1000 ft.;

Oxford, near Troy, 1400 ft.; Kellits, Clarendon, 2000 ft.; Harris! Fl. Jam. 9261, 9429, 11,153.—West Indies, Panama, tropical S. America.

Stem twining, villose-pubescent. *Leaflets* elliptical to oblong; beneath lighter-coloured and more or less softly silky-pubescent, 4–9 cm. l. *Peduncles* 1–3-flowered, 3–9 cm. l. *Bracteoles* elliptical, acute, less than half as long as the calyx, 8–9 mm. l. *Flowers* white, standard with lilac, rose, or crimson streaks in the centre, very fragrant. *Calyx* 2–3 cm. l. *Standard* 4–5 cm. l. *Pod*, valves convex, glabrous, 3·5–4 cm. l. *Seeds* somewhat globose, with a network of transparent dried mucilage.

14. TERAMNUS Sw.

Twining slender shrubby herbs. Inflorescence often of two forms on the same plant; flowers very small, a few in clusters in the axils, or 2 or more in clusters along the rhachis of axillary racemes. Calyx, segments 5 or 4. Standard obovate, narrowed

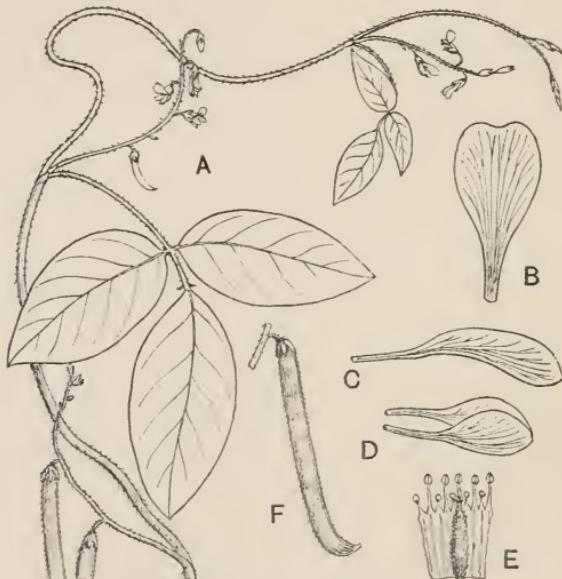


Fig. 14.—*Teramnus uncinatus* Sw.

A, End of shoot with leaves, flowers

D, Keel $\times \frac{5}{3}$.

and fruit $\times \frac{2}{3}$.

E, Stamens and pistil $\times 4$.

B, Standard $\times 3$.

F, Pod $\times \frac{2}{3}$.

C, Wing $\times 4$.

(A, E, F after Benth.)

into a long claw. Stamens all united; anthers alternately sterile. Style glabrous. Pod linear, with partitions between the seeds.

Species 6, growing in the tropics.

Pod densely villose with a hooked beak. Calyx-segments 5, longer than the tube..... 1. *T. uncinatus*.

Pod with scattered hairs and oblique beak. Calyx-segments not longer than the tube.

Leaflets oblong to elliptical-lanceolate. Calyx-segments 4..... 2. *T. volubilis*.

Leaflets elliptical, obtuse. Calyx-segments 5... 3. *T. labialis*.

1. *T. uncinatus* Sw. *Prodr.* 105 (1788) (including the synonymy under *T. volubilis*) ; calyx-segments 5, equal, linear-lanceolate, longer than the tube ; pod with a hooked beak, densely villose.—*Sv. Fl. Ind. Occ.* 1239 ; *Macf. Jam.* i. 274 ; *Benth. in Fl. Bras.* xv. pt. 1, 138, t. 37 ; *Griseb. Fl. Br. W. Ind.* 193 ; *Urb. Symb. Ant.* iv. 301. *Phaseolus sylvestris* &c. *Sloane Cat.* 71 & *Hist.* i. 182. *Teramnus triphyllus* &c. *Browne Hist. Jam.* 290. *Glycine caule piloso* &c. *Plum. Pl. Amer. (Burm.)* t. 221. *Dolichos uncinatus* L. *Sp. Pl. ed. 2*, 1019 (1763). (Fig. 14.) A specimen from Browne in the Linnean Herbarium is named by Linnaeus *D. uncinatus*.

In fl. Oct.-April ; Guanaboa, *Sloane Herb.* iii. 76 ! *Browne ! Houstoun ! Shakspear ! Swartz ! Macfadyen ! Richmond, St. Mary, McNab ! St. Thomas in the Vale, Prior ! Bog Walk, Port Morant, Lucea, Hitchcock ; Resource, Blue Mts., 3500 ft., Harris ! Fl. Jam.* 5504, 6612.—Bahamas, Cayman Is., Cuba, Hispaniola, Porto Rico, tropical continental America.

Plant covered with dense silky hairs. *Leaflets* oblong or lanceolate to elliptical, pubescent with adpressed hairs on the upper surface, densely silky-pubescent beneath, 3-7 cm. l. *Calyx* about 6 mm. l. *Corolla* reddish-purple ; standard about 6 mm. l.; wings about 5.5 mm. l., with no definite lobe at base of limb ; keel 3.5 mm. l. *Pod* 6-2.5 cm. l., 3 mm. br.

In Swartz's *Prodromus* the citations from Linnaeus, Browne, and Sloane under *T. volubilis* are shown, by comparison with his "Flora" and his own specimens in *Herb. Banks in Herb. Mus. Brit.*, to belong to his second species, *T. uncinatus*.

2. *T. volubilis* Sw. *Prodr.* 105 (1788) (excluding the synonymy) ; calyx-segments 4, upper very shortly 2-toothed, triangular, acute, shorter than the tube ; pod with scattered adpressed hairs, with an oblique beak.—*Sv. Fl. Ind. Occ.* 1241 ; *Macf. Jam.* i. 275 ; *Benth. tom. cit.* 137 ; *Griseb. loc. cit.* *Glycine oblonga* *Benth. Bot. Sulph.* 84 (1844). Specimen from Swartz in *Herb. Mus. Brit.*

In fl. Oct., Nov. ; *Swartz ! Macfadyen* ; Blue Mts., Rothrock ; Port Morant, Lucea, Hitchcock ; Charlton, near Ewarton, 1000 ft. ; Ferry River ; *Harris ! Fl. Jam.* 6695, 11,424.—Tropical South America.

Leaflets oblong or lanceolate to elliptical-lanceolate, glabrate on the upper surface, pubescent with scattered adpressed hairs beneath, 2-7 cm. l. *Calyx* 3.5-4 mm. l., villose. *Corolla* violet-rose ; standard 5 mm. l. ; wings with one broad tooth at junction of claw and limb, 5 mm. l. ; keel 3.2 mm. l. *Pod* 3-3.5 cm. l., 2 mm. br.

3. *T. labialis* Spreng. *Syst. iii.* 235 (1826) ; calyx-segments 5, ovate-lanceolate, a little shorter than the tube ; pod with a few scattered hairs or glabrate, with a short oblique beak.—*Benth. in Journ. Linn. Soc. viii.* 265 ; *Bak. in Hook. f. Fl. Br. Ind.* ii. 184. *Glycine labialis* Linn. f. *Suppl.* 325 (1781) ; *Wight Ic. t.* 168. *G. debilis* Ait. *Hort. Kew.* iii. 34 (1789) ; *Jacq. Eclogæ Pl. Rar.* t. 166. Koenig's specimen is in *Herb. Mus. Brit.*

In fl. at the end of the year ; *Lane* in *Herb. Sloane clxii.* 78 ! *Macfadyen ! Black River ; Ferry River ; Harris ! Fl. Jam.* 9923, 10,040.—Tropics.

Leaflets elliptical, obtuse, with very few hairs or glabrate on the upper

surface, with scattered adpressed hairs beneath, 1·5·5 cm. l. *Calyx* about 3·5 mm. l., villose. *Corolla* "white," turning pink; standard about 4 mm. l.; wings about 3·5 mm. l., with a rounded lobe at junction of claw and limb, and the limb kneed opposite to it; keel about 2·8 mm. l. *Pod* 3·5-4·5 cm. l., 3·5-4 mm. br., slightly curved, the upper suture forming a narrow wing.

15. ERYTHRINA L.

Trees or erect shrubs, often prickly. Racemes axillary (in Jamaican species). Flowers generally scarlet, 2 or more together along the rhachis, appearing before the leaves. Bracts and bracteoles small or none. Calyx campanulate, truncate or spathaceous. Standard much larger than the wings and keel, which are often included within the calyx. Uppermost stamen free or united at the base with the rest, the others united about, or above, the middle. Pod stalked, constricted or sinuate between the seeds, 2-valved or opening only along the upper margin, or scarcely opening.

Species 30, natives of the tropics.

- | | |
|--|-------------------------------|
| Glabrous. Standard erect, folded together,
oblong..... | 1. <i>E. corallodendrum</i> . |
| Tomentose. Standard reflexed, nearly as
broad as long | 2. <i>E. velutina</i> . |

1. *E. corallodendrum* L. *Sp. Pl.* 706 (1753); glabrous; calyx tubular; standard oblong, folded together, slightly curved, erect. —*Wright Mem.* 292; *Macf. Jam. i.* 297; *Benth. in Fl. Bras.* xv. pt. 1, 174; *Griseb. Fl. Br. W. Ind.* 199; *Urb. Symb. Ant.* iv. 302. Coral arbor non spinosa flore longiore et magis clauso *Sloane Cat.* 143 & *Hist. ii.* 38, t. 178, f. 1, 2. Coral arbor americana *Commel. Amst. i.* 211, t. 108. *Erythrina arborea* spinosa et non spinosa &c. *Browne Hist. Jam.* 288. Specimens from Hort. Cliff. and Sloane in Herb. Mus. Brit. Type in Herb. Linn.

Coral Tree, Red Bean Tree.

Sloane Herb. vi. 121 *Broughton!* *Macfadyen!* *J.P. 910, Morris!* Mount Faraway, 5000 ft., *Harris!* *Fl. Jam.* 7309; *Lucea, Hitchcock.*—West Indies, Central and S. America.

Tree 15-20 ft., with or without thick spines here and there on the stem. Leaflets broadly ovate-rhomboid, 5-10-(15) cm. l. Flowers 2-3 together. Calyx truncate, occasionally shortly split, 1·2 cm. l.; teeth very small or wanting. Corolla deep crimson; standard 4 times as long as the keel, to 7 cm. l., to 2 cm. br.; wings a little longer than the calyx; keel of separate petals, a little shorter than the wings. Stamens shorter than the standard, the uppermost united with the rest at the base. Pod contracted between the seeds, about 1 dm. l.; the lower part stalk-like and apex long-beaked. Seeds scarlet, about 1 cm. l.

2. *E. velutina* Willd. *Sp. Pl. iii.* 914; inflorescence, leaves and pods, covered with tomentum, at length deciduous, especially on the upper surface of leaves; calyx spathe-like, tomentose;

standard nearly as broad as long, reflexed.—*Rer. J. Lindsay Ic. ined.*; *Lowe in Bot. Mag. t. 3227*; *Macf. Jam. i. 298*; *Benth. tom. cit. 173*; *Griseb. loc. cit.* Coral arbor *Sloane Cat. 142 & Hist. ii. 38.* (Fig. 15.)

Coral Tree, Red Bean Tree.

Sloane Herb. vi. 11! *Wright!* *Robins!* *Macfadyen;* Savanna la Mar, Purdie! Moneague, Prior! Arcadia, St. Ann, Mrs. Sewell! Gordon Town, J.P. 1314, Hart! Chapelton, Mrs. Craig! between Rose Hill and Temple Hall; Chapelton; Fawcett!—Tropical S. America.

Tree to 30 ft., with short spines on the stem. Leaflets variable in shape, more or less ovate-rhomboid, triangular, or roundish, lateral oblique,

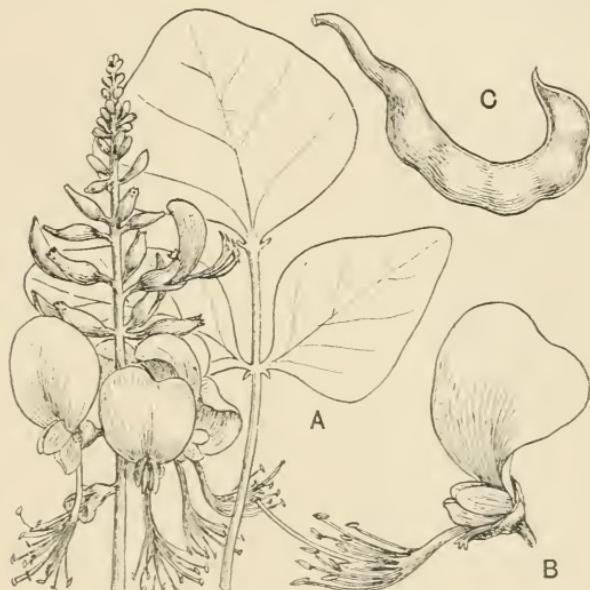


Fig. 15.—*Erythrina velutina* Willd.

A, Leaf and raceme. B, Flower. C, Pod. All $\times \frac{1}{2}$.

almost always tomentose beneath, 4–9 cm. l. Flower-buds oblong-ellipsoidal, 2·5–3 cm. l. Flowers 2–3 together. Calyx 1·5–2 cm. l. Corolla, standard orange-red (almost vermillion), 3·2–6 cm. l.; wings exserted, chestnut-red with purple-red edge; keel of 2 petals similar in shape and colour to the wings and about the same length. Stamens about 6 cm. l. Pod somewhat contracted between the seeds, about 13 cm. l.; sometimes 1-seeded, 5–8 cm. l., tomentose, the lower part seedless, with a short beak at the apex. Seeds vermillion-red, about 1·5 cm. l.

16. MUCUNA Adans.

Twining herbs or shrubs. Lateral leaflets unequal-sided. Stipules deciduous. Flowers in racemes which are sometimes subumbellate, large, purple, red or yellowish, occurring singly or in clusters on the rhachis. Calyx shortly campanulate, with

4 segments or 4–5 teeth. Standard auricled at the base, shorter than the wings. Uppermost stamen free, the rest united; anthers alternately basifix and versatile, the latter bearded and with filaments somewhat thickened above. Pod thick, leathery, hairy, often with stinging hairs; the seeds separated by partitions or by tissue; hilum enlarged.

Species 30, growing in the tropics.

Leaflets glabrous beneath 1. *M. urens*.
Leaflets hairy beneath.

Flowers clustered at end of peduncle.

Flowers subumbellate 2. *M. Sloanei*.
Flowers on an expanded receptacle 3. *M. Fawcettii*.
Flowers racemose 4. *M. pruriens*.

1. *M. urens* *Fawc. & Rendle* in *Journ. Bot. lv. 36* (1917) (non *DC.*) ; leaflets elliptical, abruptly and shortly acuminate, glabrous on both sides; peduncle about 10 times as long as the petiole, with several flowers, 1, 2 or 3 together in a contracted raceme at the apex; pod with 2 narrow wings only along the upper margin and numerous obliquely transverse ribs.—*M. altissima DC. Prodr. ii. 405* (1825); *Benth. in Fl. Bras. xv. pt. 1, 170, t. 46, A*; *Griseb. Fl. Br. W. Ind. 198*; *Urb. Symb. Ant. iv. 304, v. 372*. *Phaseolus americanus* frutescens &c. *Pluk. Phyt. t. 213, f. 2*, *Alm. 292*. *Zoophthalmum siliquis* &c. *Browne Hist. Jam. 295*. *Dolichos urens L. Syst. ed. 10, 1162* (1759). *Clitoria Zoophthalmum L. Syst. ed. 10, 1172* (1759). *Dolichos altissimus Jacq. Enum. Pl. Carib. 27* (1760) (excl. syn.) & *Sel. Stirp. Amer. 203, t. 182, f. 85* (excl. syn.), *Ed. pict. t. 190*. *Plukenet's specimen* is in *Herb. Mus. Brit. (Herb. Sloane)*.

Ox Eye Bean.

Rare; in fl. Sept. and Oct.; *Browne*; St. Mary, *McNab!* mountain woods, Manchioneal, *Wilson*.—West Indies, Panama, Brazil.

Stem climbing high over trees, glabrous. *Leaflets* 8–16 cm. l., 5–7·5 cm. br.; petioles 5–13 cm. l. *Peduncle* to 1·5 m. l., slender, pendulous. *Flowers* blue-purplish with a yellowish keel. *Calyx*, tube 1·1–1·2 cm. l., truncate, toothed, uppermost tooth emarginate, lateral nearer to the lowest which is the longest, about 4 mm. l. *Corolla*: standard 3–4 cm. l., adpressed to wings and keel, three-fourths to nearly as long as the wings, very broad; wings with a long claw which is 1–1·5 cm. l. and tomentose at the edges; keel slightly longer than the wings. *Pod* 12–23 cm. l., 5 cm. br., hispid with bristly stinging hairs and also pubescent. *Seeds* about 4, flattened-rounded, almost surrounded by the hilum, 3 cm. in diam., or even larger.

Dolichos urens L. Syst. is based on Browne's description of *Zoophthalmum* and on Plukenet's figure. Plukenet's specimen in *Herb. Sloane* has leaves which are glabrous on both sides, and Browne's description states that the peduncle is "seldom under four or five feet in length"; it is therefore clear from these two diagnostic details to which species Linnaeus's name, as given in the *Systema*, belongs. *Jacquin* in *Sel. Stirp. Amer. 202, 3*, has given long and careful descriptions of this and a second West Indian species, which he calls respectively *D. altissimus* and *D. urens*, thus applying Linnaeus's name to the wrong species. *De Candolle* followed

Jacquin in the misapplication of the name, when transferring the two species to the genus *Mucuna*. *D. urens* L. Syst. must therefore be cited as *Mucuna urens* (non DC.), of which *M. altissima* DC. is a synonym, and the species known as *M. urens* DC. must be renamed.

2. *M. Sloanei* Fawc. & Rendle loc. cit.; leaflets, terminal elliptical, lateral ovate, generally shortly acuminate, densely covered beneath with small adpressed silky hairs; peduncle about as long as the petiole or twice as long, with several flowers in a subumbellate cluster at the apex; pod with 2 narrow wings along each margin and numerous obliquely transverse narrow wings.
—*M. urens* DC. Prodr. ii. 405 (1825) (excl. ref. to Pluk.); Macf.

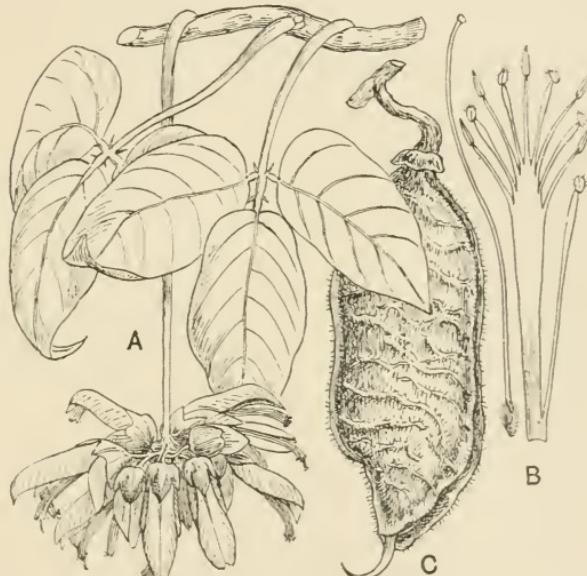


Fig. 16.—*Mucuna Sloanei* Fawc. & Rendle.

A, Portion of stem with inflorescence and leaves $\times \frac{1}{4}$. B, Stamens and pistil $\times \frac{5}{2}$.
C, Pod $\times \frac{1}{2}$.

Jam. i. 294; *Benth.* tom. cit. 169, t. 46, f. I. (I.); *Griseb.* loc. cit.; *Urb.* op. cit. iv. 303, v. 372. *Mucuna* *Mareg.* *Bras.* 18. *Phaseolus brasiliensis* &c. *Sloane Cat.* 68 & *Hist. i.* 178. *Phaseolus siliquis latis* &c. *Plum. Descr. Pl. Amer.* t. 107 & *Ic. ined.* iv. t. 237. *Dolichos urens* *Jacq. Enum. Pl. Carib.* 27 (1760) & *Sel. Stirp. Amer.* 202, t. 182, f. 84 (excl. syn. *Browne*) & *Ed. pict.* t. 189; *L. Sp. Pl. ed.* 2, 1020 (so far as it refers to syn. *Mareg.*, *Sloane*, and *Jacq.*). *Negretia urens* *Tussac Fl. Ant.* ii. 52, t. 13 (1818). (Fig. 16.)

Horse Eye Bean.

In fl. Feb.; Rio Cobre, Guanaboa, *Sloane Herb.* iii. 69! *Lane* in *Herb. Sloane* clxii. 81! *Wright!* *Hope*, *Broughton!* *Macfadyen*; *Wullschlaegel*; *Prior*; *Chatsworth*, *Harris!* *Fl. Jam.* 5590.—West Indies, tropical continental America, tropical west Africa.

Stem climbing over high trees. *Leaflets*, 7–16 cm. l., 4·5–9 cm. br.; petioles 7–11 cm. l. *Pedicels* about 1 cm. l. or rather less. *Flowers* yellow. *Calyx*: tube about 1 cm. l.; upper segment very broad, entire or shortly 2-toothed; lateral smaller; the lowest longer, about equalling the tube, triangular, acute. *Corolla*: standard spreading erect, 3–3·5 cm. l., about half as long as the wings; wings 5–5·5 cm. l., claw very short; keel a little longer than the wings. *Pod* 10–15 cm. l., about 4 cm. br., hispid with bristly hairs and pubescent; wings 2–5 mm. br. *Seeds* 2–4, compressed-roundish, almost surrounded by the hilum, 2 to nearly 3 cm. in diam.

3. *M. Fawcettii* Urb. *Symb. Ant.* v. 371 (1908); leaflets roundish or roundish-elliptical or roundish-ovate, abruptly and shortly acuminate, densely covered beneath with adpressed silky hairs; peduncles about as long as the petioles, expanded at the end into a flattish-convex receptacle (1 cm. br.), from which spring several flowers; pod 1-seeded and obovate-semiorbicircular or 2-seeded and oblong-elliptical, with ribs along the margins almost obsolete.

In fl. Nov., Dec.; near Troy, 2000 ft., Harris! Fl. Jam. 8818, 9102.

Stem climbing over rocks. *Leaflets*, 13–17 cm. l., 12–15 cm. br.; petioles 1–2 dm. l. *Bracts* forming an involucre round the receptacle, the outer somewhat elliptical, the inner narrower and even linear. *Pedicels* about 1 cm. l. *Flowers* yellow. *Calyx*: tube 1–1·2 cm. l.; upper segment very broad, entire, lateral and lowest about equal, 8–9 mm. l. *Corolla*: standard two-thirds as long as the wings, 5–5·5 cm. l.; wings 7–8 cm. l., slightly shorter than the keel. *Pod* 12 cm. l., 5·5 cm. br., covered with tomentum, amongst which are scattered bristly hairs. *Seeds* 1 or 2, flattened-roundish, 3·5–4 cm. in diam., almost surrounded by the hilum, which is about 1 cm. br.

4. *M. pruriens* DC. *Prodri. ii.* 405 (1825); leaflets, terminal rhomboid, lateral triangular, with long adpressed hairs beneath; peduncles as long as the petioles or longer, with numerous flowers, 2 or 3 together in a long raceme; pod with ribs along each margin concealed by dense brownish-yellow itching hairs.—*Wright Mem.* 209; *Macf. loc. cit.*; *Bot. Reg.* 1838, t. 18; *Benth. loc. cit.* t. 46, f. I. (II.) & II.; *Griseb. loc. cit.*; *Urb. Symb. Ant.* iv. 303. *Cacara pruritus* Rumph. *Amboin.* v. 393, t. 142. *Phaseolus americanus* foliis &c. *Pluk. Phyt.* t. 214, f. 1. *Phaseolus utrinque Indiae* &c. *Sloane Cat.* 69 & *Hist. i.* 37. *Stizolobium spicis* &c. *Browne Hist. Jam.* 290, t. 31, f. 4; *Rev. J. Lindsay Ic. ined.* *Dolichos pruriens* L. *Syst. ed.* 10, 1162 (1759) & *Sp. Pl. ed.* 2, 1019; *Jacq. Sel. Stirp. Amer.* 201, t. 122 & *Ed. pict.* t. 188.

Cowhage, *Cowitch*, *Vine Gungo Pea*.

In fl. Oct.–Feb.; *Sloane Herb.* iii. 75! *Browne*; *Distin!* St. Mary, *McNab!* J.P. 636, *Morris!* Yallahs Valley, *Watt!* Hope grounds, *Cradwick!* also *Harris!* above Cane River Falls, *Fawcett!* also *Harris!* Tyre, near Troy (cultivated) *Harris!* Fl. Jam. 6593, 7353, 8257, 8622, 9097; *Bog Walk*, *Hitchcock*; *Porus*, *Lloyd.*—*Tropics*.

Stem climbing over bushes and low trees. *Leaflets* 7–15 cm. l., 6–9 cm. br.; petioles 1–3 dm. l. *Flowers* dark brown purplish, rarely light yellow and white. *Calyx*: tube 5–6 mm. l., 3 upper segments triangular, acute,

as long as the tube, the lowest narrower and a little longer. *Corolla*: standard half as long as the wings; wings nearly 3·5 cm. l.; keel a little longer than the wings. *Pod* 4–8 cm. l., about 1·5 cm. br. *Seeds* 2–6, transversely oblong, with a short oblong hilum, spotted, about 1 cm. l.

17. GALACTIA Adans.

Twining, somewhat shrubby slender herbs. Flowers in clusters in racemes or occasionally simply clustered or solitary, the clusters springing from thickenings on the rhachis. Calyx-segments 4, acuminate, as long as the tube to more than twice as long. Uppermost stamen free, or rarely slightly united in the middle with the rest; anthers uniform, versatile. Style slender, without hairs; stigma small, terminal. Pod linear, compressed; the seeds separated by tissue.

Species 50, growing in the tropics, especially in America.

- Corolla* 2–2·5 cm. l..... 1. *G. pendula*.
Corolla 1 cm. l. or less.

Twining or trailing vines.

Raceme several- or many-flowered.

- Calyx hairy, 7 mm. l., segments twice as long as
 tube..... 2. *G. striata*.

- Calyx subglabrous, 4 mm. l., segments as long as
 tube..... 5. *G. laxiflora*.

Flowers solitary or few in a raceme.

- Leaflets mostly elliptical..... 3. *G. uniflora*.

- Leaflets mostly linear to linear-oblong..... 4. *G. parvifolia*.

- Erect shrub, 2 ft. high..... 6. *G. Jussiaeana*.

1. *G. pendula* Pers. *Syn. ii.* 302 (1807) (excl. Cajenna); leaflets 1·5–7 cm. l., glabrous on both sides, or sometimes minutely puberulous on the midrib above, and puberulous beneath; calyx sparingly puberulous, 7–8 mm. l., lateral segments about as long as the tube, the others longer; standard 2–2·5 cm. l.; pod 7–9 cm. l., 6–9 mm. br., curved at apex, puberulous.—*Bot. Reg. t.* 269; *Macf. Jam. i.* 254; *Griseb. Fl. Br. W. Ind.* 194; *Urb. Symb. Ant. ii.* 328. *G. foliis ovatis &c. Browne Hist. Jam.* 298, *t. 32, f. 2*. *Phaseolus minor lactescens &c. Sloane Cat. 71 & Hist. i.* 182, *t. 114, f. 4*. *Clitoria lactescens L. Syst. ed. 10, 1172 (1759) (?)*. *Glycine Galactia L. Syst. ed. 10, 1173 (1759)*. *Clitoria Galactia L. Sp. Pl. ed. 2, 1026 (1763)*. *Hedysarum scandens Miller Gard. Dict. ed. 8 (1768)*; *Britten & Bak. f. in Journ. Bot. xxxv. 231*. (Fig. 17.) The type, Sloane's specimen, is in Herb. Mus. Brit. There is a specimen in Herb. Linn. named by Linnaeus *Glycine Galactia*.

In fl. July-Jan.; *Sloane Herb. iii. 77, 78!* *Lane in Herb. Sloane clxii. 78!* *Houstoun!* *Shakspear!* *Bancroft!* *Macfadyen!* St. Ann, *McNab!* *Purdie!* *Wilson!* *March!* *Eggers!* J.P. 2127, *Morris!* *Mavis Bank, Fawcett!* Long Mt. road, 100 ft.; *Campbell!* *Guava Ridge;* Hall's Delight; near Mocha, 2500 ft.; near Gordon Town, 2300 ft.; Long Mt., 800 ft.;

Green Valley, 2000 ft.; Great Goat Is.; Round Hill, S. Cruz Mts., 2000 ft.; Plowden Hill, 1500 ft.; *Harris!* Fl. Jam. 5502, 5861, 6138, 6178, 6509, 6859, 8864, 9344, 9699, 10,164, 11,659.

Stem twining, climbing to a height of 20 ft. in trees; younger branches puberulous or glabrate. *Leaflets* elliptical, oblong-elliptical, ovate-elliptical, or lanceolate-elliptical; stalk of the terminal leaflet 3–10 mm. l. (and more); stipules awl-shaped, about 4 mm. l. *Inflorescence* 7–30 cm. l., with numerous small clusters of few (–1) flowers from near the base. *Bracteoles* ovate-acuminate, 2 mm. l. *Corolla* rosy, rosy-crimson, or white tinged with rose; standard elliptical; wings a little shorter than the keel; keel a little

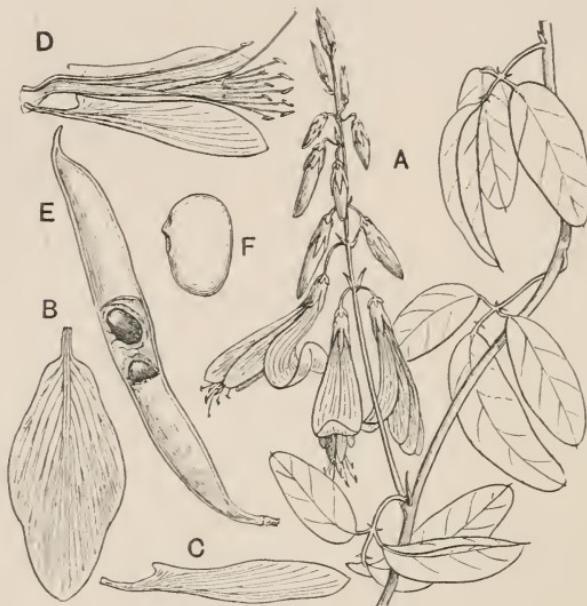


Fig. 17.—*Galactia pendula* Pers.

A, Portion of stem with inflorescence and leaves $\times \frac{2}{3}$.
 B, Standard $\times 1\frac{1}{3}$.
 C, Wing $\times 1\frac{1}{3}$.
 D, Keel opened, exposing stamens, and pistil $\times 1\frac{1}{3}$.
 E, Pod $\times \frac{2}{3}$.
 F, Seed $\times 2$.

(A, after Bot. Reg.)

shorter than the standard. *Stamens* alternately longer and shorter, uppermost quite free from the rest; anthers versatile, narrowly oblong. *Seeds* shortly ovate or subrhomboid, brown with blackish spots, 5–6 mm. l.

2. *G. striata* Urb. *Symb. Ant.* ii. 320 (1900) (incl. vars.); leaflets 3–5 (2–8) cm. l., pubescent with adpressed hairs on the upper surface or glabrescent, more or less densely covered beneath with adpressed velvety hairs; calyx covered with silky adpressed hairs, 7 (5–8) mm. l., segments 2 to $2\frac{1}{2}$ times longer than the tube; standard 7–9(–11) mm. l.; pod 4–7 cm. l., 6–9 mm. br., more or less densely pubescent.—*G. filiformis* Griseb. *loc. cit.* (in part) (non Benth.). *G. cubensis* H. B. & K. *Nov. Gen. & Sp.* vi.

429 (1824). *Glycine striata* Jacq. *Hort. Vindob.* i. 32, t. 76 (1770). Jacquin's type from Hort. Vindob. is in Herb. Mus. Brit. A specimen in Herb. Linn. has a ticket attached with Jacquin's name written by himself.

Houston! Lane in Herb. Sloane clxii. 78! *Distin!* Forster! *Macfadyen* Fairfield, *Wullschaegel*; Kingston, *Hitchcock*; Yardley Chase, 1600 ft.; Luana Point; Great Goat Is.; Ferry R.; Hope grounds; *Harris!* near Angels Pen, *Harris & Britton!* Port Henderson, *Ridley!* Fl. Jam. 9677, 9926, 10,162, 11,791, 12,288.—Cuba, Hispaniola, Mona, Porto Rico, St. Thomas, Guadeloupe, Tobago.

Stem twining, climbing over low shrubs, pubescent or glabrate. *Leaflets* elliptical, seldom ovate-elliptical, petiolule of the terminal leaflet 4–12 mm. l.; stipules awl-shaped, 2–4 mm. l. *Inflorescence* 2–8(–15) cm. l., with several flowers in the upper half; peduncle 1–4·5 cm. l. *Corolla*, standard purple or rosy, marked with longitudinal lines, obovate; wings and keel about as long as the standard. *Stamens*, anthers versatile, narrowly oblong; uppermost filament free. *Seeds* kidney-shaped, 3·5–4 mm. l.

Urban (tom. cit. 321, 322) distinguishes five varieties; of these var. *tomentosa* agrees with Jacquin's type of the species; var. *cubensis* is a less hairy form, *G. cubensis* H. B. & K., *G. filiformis* Griseb. loc. cit. (in part) (1860) (non *Benth.*).

The specimens from Luana Point and Angels Pen belong to var. *cubensis*, the rest agree better with var. *tomentosa*.

3. *G. uniflora* Urb. *Symb. Ant.* ii. 325 (1900); leaflets 1–2 (·8–3) cm. l., elliptical, obovate-elliptical, or oblong-elliptical, somewhat unequal, the terminal sometimes longer by one-third, with short soft adpressed hairs on both sides or glabrescent, net-veined on both surfaces; inflorescence short, 1–3-flowered; peduncle (very short to 7 mm. l.) and pedicel (to 4 mm. l.) puberulous; calyx pubescent, 6 mm. l., segments about 1½ times as long as the tube; standard 8–9 mm. l.; pod 3–4 cm. l., 4–4·5 mm. br., densely pubescent with adpressed hairs.—*G. angustifolia* Hitchc. in *Rep. Miss. Bot. Gard.* (1893) 77 (fide Urb. loc. cit., non Kunth). *G. tenuiflora* Hitchc. tom. cit. 78 (fide Urb., non Wight & Arn.).

Lititz Savanna, 300–900 ft., *Harris!* Fl. Jam. 11,727.—Bahamas, Cuba.

Stem very slender, twining amongst grasses, white-puberulous. *Leaflets* elliptical, obovate-elliptical, or oblong-elliptical, petiolule of the terminal leaflet 2–4 mm. l.; stipules awl-shaped, 1·5–2 mm. l. *Corolla* pale lilac. *Stamen* free above the base, shortly united in the middle to the rest. *Seeds* olive-green with dark-purplish markings, 2·5–3 mm. l. Possibly this is only a small form of *G. dubia* DC.

4. *G. parvifolia* A. Rich. in *Sagra Cub.* x. 176 (1845) & *Ess. Fl. Cub.* 414; leaflets differing much in number, form, and size, 3 or 1, linear to oblong or the lowest sometimes elliptical or elliptical-oblong, unequal, the terminal sometimes twice as long, ·5–8 cm. l., glabrous and prominently net-veined on the upper surface, more or less puberulous beneath; inflorescence short, 1–3-flowered; peduncle (·4–1 cm. l.) and pedicel (1–3 mm. l.)

puberulous or glabrescent; calyx sparingly puberulous, 4–6 mm. l., the lowest segment lanceolate, acuminate, generally about twice as long as the tube, lateral and upper segments shorter; standard 9–12 mm. l.; pod 2–5·5 cm. l., 4–6 mm. br., hirtellous with adpressed hairs.—*Urb. Symb. Ant.* ii. 314 (1900) (incl. vars.). *G. angustifolia* (and vars.) *Griseb. Cat. Pl. Cub.* 75 (non *H. B. & K.*). *G. stenophylla* *Urb. tom. cit.* 313. *Dolichos herbaceus minor* foliis linearibus &c. *Browne Hist. Jam.* 294. *D. filiformis L. Syst. ed.* 10, 1163 (1759); *Amœn. v.* 492 & *Sp. Pl. ed.* 2, 1021. Type of Linnaeus's species is in *Herb. Linn.* and part of same specimen in *Herb. Mus. Brit.*

Frequent about Old Harbour, *Browne!* Old Harbour, *Ridley!*—Cuba, Hispaniola.

Stem very slender, twining, minutely puberulous or glabrescent. *Leaflets* apex obtuse, mucronulate or subtruncate, papery; petiole 1·3 cm. l.; petiolule of terminal leaflet 4–1 mm. l.; stipules awl-shaped-lanceolate, 1·5–2 mm. l. *Corolla* red or purple (Wright); standard roundish, reflexed, claw 1·5 mm. l.; wings slightly shorter and narrower than keel; keel about as long as the standard; ovary 12–15 ovuled.

5. *G. laxiflora* *Urb. Symb. Ant.* ii. 315 (1900); leaflets 2·5–4 cm. l., glabrous on upper surface, hairy beneath with short adpressed hairs; calyx with a few very short hairs or subglabrous, 4–4·5 mm. l., segments subequal, as long as the tube, the uppermost a little longer; standard 7–8 mm. l.; pod 5–6 cm. l., 5–5·5 mm. br., sparingly puberulous.—*G. filiformis Griseb. Fl. Br. W. Ind.* 194 (1860) (in part) (non *Benth.*). *G. Lockharti Fawc. Fl. Pl. Jam.* 10 (1893) (non *Griseb.*).

Prior.

Stem twining, hairy near the apex. *Leaflets* ovate-oblong or ovate-lanceolate; petiolule of the terminal leaflet 5–8 mm. l. *Inflorescence* to 20 cm. l., with several flowers distant from each other; peduncle 3–7 cm. l. *Corolla*, wings 6 mm. l., a little shorter than the keel. *Stamen*, uppermost free.

An incomplete specimen from Dr. Wm. Wright (?) in the Edinburgh Herbarium may perhaps belong here.

6. *G. Jussiæana* *Kunth Mimos.* 196, t. 55 (1824); leaflets 2·5–7 cm. l., white-silky above, white-silky-tomentose beneath; calyx silvery-silky, 6–8 mm. l.; segments about twice as long as tube; corolla with reflexed-spreading standard, about 1 cm. l.; pod silky-tomentose, 5–6 cm. l., 5–6 mm. br.—*H. B. & K. Nov. Gen. & Sp.* 429; *Benth. in Fl Bras. xv. pt. 1,* 142; *Urb. Symb. Ant.* v. 373; *Britton in Bull. Torr. Bot. Club xlivi.* 452. *Clitoria glomerata Griseb. Cat. Cub.* 74 (1866).

Bertero.—Cuba, Is. of Pines, Hispaniola, tropical S. America.

Stem trailing ("repens" Kunth), erect, 2 ft. high (Britton), branches white-silky-tomentose. *Leaflets* elliptical; petiolule of the terminal leaflet 6–8 mm. l.; stipules lanceolate-awl-shaped, 2–4 mm. l. *Inflorescence* a

subsessile cluster to 3 cm. l., with several flowers. Corolla rosaceous; standard roundish-obovate, apex acute, ciliate; wings shorter than the standard and keel. Stamens, anthers versatile, elliptical; uppermost filament free.

We have not seen a specimen from Jamaica.

18. DIOCLEA H. B. & K.

Twining shrubs. Flowers in small clusters springing from thickenings on the elongated peduncle. Calyx campanulate, silky within, with 4 segments. Standard roundish, with infolded auricles at the base. Stamens united; alternate anthers very

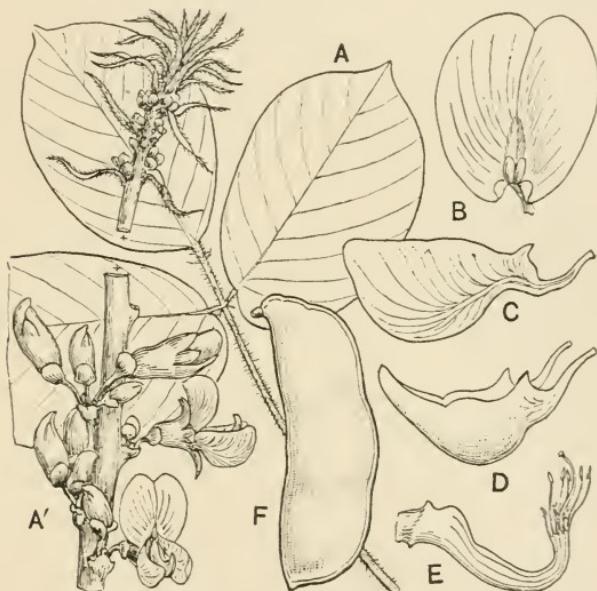


Fig. 18.—*Dioclea reflexa* Hook. f.

A, Leaf $\times \frac{1}{3}$.

A', Portions of inflorescence $\times \frac{2}{3}$.

B, Standard $\times 1\frac{1}{2}$.

C, Wing $\times 1\frac{1}{2}$.

D, Keel $\times 1\frac{1}{2}$.

E, Stamens enclosing pistil $\times 1\frac{1}{2}$.

F, Pod $\times \frac{1}{3}$.

small, sterile in *D. reflexa* and in some other species, uniform in other species. Pod compressed or swollen, the upper margin thickened or 2-winged, with tissue between the seeds.

Species 17, natives mostly of tropical America, of which two are found also in tropical Africa.

D. reflexa Hook. f. in *Hook. Niger Fl.* 306 (1849); Griseb. *Fl. Br. W. Ind.* 198; Wils. in *Reports Geolog. Jam.* 277; Bak. in *Hook. f. Fl. Br. Ind. ii.* 196; Urb. *Symb. Ant. i.* 473. *Dolichos filiformis* Macf. *Jam. i.* 286 (1837) (non L.).

"Lower hills on fences; St. Andrew," Macfadyen; Wilson!—West Indies, America, Africa, tropical Asia, New Guinea.

Stem stout, climbing over high trees; branches, petioles, and inflorescence covered with brownish spreading hairs or glabrate. *Leaflets* elliptical, more or less pubescent with adpressed hairs, longer and denser on the midrib and nerves, or more or less glabrate, 8–16 cm. l. *Raceme* long, 1·5–3 dm. l. *Bracts* long, lanceolate or linear, reflexed, deciduous, about 1·5 cm. l. *Bracteoles* small, roundish. *Calyx* about 1·5 cm. l., brownish-silky; upper segment emarginate. *Corolla* reddish verging on violet with a yellow spot at the base of the standard; standard with 2 prominent calli in the centre at the base, about 2 cm. l.; wings rhomboid, very broad, auricle triangular, about as long as the standard; keel-petals adherent in the upper half, shortly beaked, a little shorter than the wings. *Pod* oblong, 9–13 cm. l., 4·5–6 cm. br.; upper margin much thickened, furrowed, lower less so. *Seeds* 1–3, roundish, 2·5–3 cm. l., hilum linear, elongated.

19. CANAVALIA Adans.

Herbs, twining or (in *C. obtusifolia*) creeping. Leaves pinnately 3-foliolate. Flowers clustered at minute tubercles along the rhachis of a raceme. Calyx 2-lipped; upper lip very large, entire or 2-lobed, lower small, 3-lobed. Standard roundish, reflexed. Filaments of stamens all united into a closed sheath, or the uppermost stamen free at the base and slightly adhering above; anthers uniform, versatile. Pod large, compressed, with a longitudinal rib on each side near the upper margin, with tissue between the seeds.

Species 12, natives of the tropics.

Stem creeping. Leaflets roundish to obovate-elliptical... 1. *C. obtusifolia*.
Stem climbing. Leaflets ovate-elliptical or elliptical.

Standard auriculate. Ribs of pod 3–7 mm. from margin	2. <i>C. ensiformis</i> .
Standard without auricles. Ribs of pod 1 cm. from margin	3. <i>C. altissima</i> .

1. *C. obtusifolia* DC. *Prodr. ii.* 404 (1825); stem creeping; leaflets roundish to obovate-elliptical, apex rounded, sometimes emarginate, terminal often somewhat wedge-shaped, glabrescent at base; racemes few-flowered; standard auriculate; pod few-seeded, ribs close (2–3 mm.) to the margin.—*Benth. in Fl. Bras. xv. pt. i.* 178, t. 48; *Griseb. Fl. Br. W. Ind.* 197; *Bak. in Hook. f. Fl. Br. Ind. ii.* 196; *Urb. Symb. Ant. iv.* 306. *C. rosea* Macf. *Jam. i.* 292 (1837). *Phaseolus maritimus* purgans &c. *Pluk. Phyt. t. 51, f. 2*, *Alm.* 292. *P. maritimus* rotundifolius &c. *Sloane Cat.* 69 & *Hist. i.* 179. *Dolichos maritimus* repens &c. *Browne Hist. Jam.* 293. *D. obtusifolius* Lam. *Encyc. ii.* 295 (1786). *D. roseus* Sw. *Prodr. 105* (1788) & *Fl. Ind. Occ.* 1243. *D. emarginatus* Jacq. *Hort. Schoenbr. ii. t. 221* (1797).

On sandy sea-shores; in fl. & fr. throughout the year; *Sloane Herb. iii. 70!* *Lane* in *Herb. Sloane clxii. 79!* *Houston!* *Broughton!* *Liguanea plain, Campbell!* *Falmouth, Ewen!* *Kingston, Hitchcock;* *Lime Cay; Bluefields; Fawcett!* *Healthshire Hills, Harris!* *Fl. Jam. 6429, 9544.*—Tropical and subtropical regions.

Stem often several feet long, glabrescent. *Leaflets* 5–10 cm. l. *Racemes* 1·5–3 dm. l. *Flowers* violet-rosy. *Calyx* 1–1·5 cm. l. *Corolla*: standard, apex emarginate, with small infolded auricles and 2 prominent calli at the

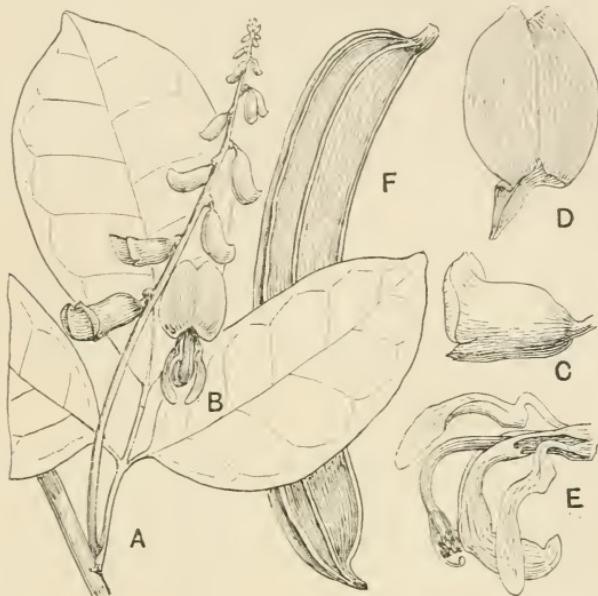


Fig. 19.—*Canavalia altissima* Macf.

A, Leaf and inflorescence $\times \frac{2}{3}$.
B, Single flower $\times \frac{3}{2}$.
C, Calyx $\times 1\frac{1}{2}$.
D, Standard $\times 1\frac{1}{2}$.

E, Wings, keel, stamens, and pistil
pulled apart $\times 1\frac{1}{2}$.
F, Pod $\times \frac{1}{2}$.

base, 2·5–3·5 cm. l.; keel-petals united about the middle, as long as the wings, shorter than the standard, curved. Filaments of stamens all united. Pod 1·5–2·5 dm. l., 3–2·5 cm. br., linear-oblong, straight; glabrescent. Seeds chestnut-coloured, 1·25–1·5 cm. l.

2. *C. ensiformis* DC. *Prodr. ii.* 404 (1825); stem twining; leaflets ovate-elliptical, acute to acuminate, mucronate, glabrescent; racemes many-flowered; upper lip of calyx about as long as the tube; standard auriculate; pod many-seeded, ribs near (3–8 mm.) to the margin.—*Macf. Jam. i.* 291; *Bak. tom. cit.* 195. *C. gladiata* DC. *loc. cit.* (1825); *Macf. loc. cit.*; *Wight Ic. iii. t. 753*; *Benth. loc. cit.*; *Griseb. loc. cit.* *Phaseolus maximus siliqua ensiformi & semine albo &c. Sloane Cat. 68 & Hist. i. 177, t. 114, f. 1, 2, 3.* *P. suberectus major &c. Browne Hist. Jam. 291.* *Dolichos ensiformis L. Sp. Pl. 725 (1753).* *D. gladiatus Jacq. Collect. ii. 276 (1788) & Ic. Pl. Rar. iii. t. 560.* Type in Herb. Mus. Brit. and specimen from Jacquin's Herb.

Horse Bean, Overlook Bean, Sword Bean, Jack Bean.
Sloane Herb. iii. 67! *Macfadyen*; Maroon Town, St. James, Knollys!—Tropics.

Stem climbing high, glabrescent. *Leaflets* 7-13 cm. l. *Racemes* to 3 dm. and longer, flowering in the upper half. *Flowers* pendulous, white tinged with red or purplish-violet. *Calyx* about 1·25-1·5 cm. l., upper lip emarginate. *Corolla*, as in *C. obtusifolia*, nearly 3 cm. l. Uppermost stamen free at base and slightly adhering to the sheath above. *Pod* 1·5-2·5 dm. l., 2·5-3·5 cm. br., linear-oblong, slightly curved, glabrescent or glabrous. *Seeds* reddish or white, to 2 cm. l.

Experiments seem to show that the food value of this bean for cattle is great, as indicated by Church's analysis ("Food Grains of India"). The tender half-grown pods of a variety, *mollis*, which grows in India in the Nilghiri hills, are eaten in the same way as French Beans. This species is extensively grown as a cover crop, and soil renovator.

3. *C. altissima* Macf. *Jam. i.* 292 (1837) (excl. syn.) ; stem twining, climbing high ; leaflets elliptical or oblong-elliptical, sometimes somewhat obovate, apex blunt, sometimes emarginate, mucronulate, glabrous ; upper lip of calyx shorter than the tube ; standard without auricles ; ribs of pod distant (1 cm.) from the margin.—*Griseb. loc. cit.* (Fig. 19.)

Overlook Bean.

Port Royal and St. John's Hills, Macfadyen ! Distin ! Gosse ! March ! J. P. 988, Morris ! Guava Ridge, 1000 ft.; near Troy, 2,500 ft., Harris !

Stem glabrous. *Leaflets* 7-9 cm. l. *Racemes* to 1 dm. l., sometimes branched ; peduncle about as long or shorter. *Flowers* pendulous, white, standard dark-purple. *Calyx* about 1·25 cm. l., upper lip entire, sometimes reflexed, emarginate. *Corolla*: standard strongly reflexed, emarginate, 2 cm. l.; keel about as long as the standard and longer than the wings, and curved in a semicircle. *Stamens*, uppermost free at base and slightly adhering to the sheath above. *Pod* about 1·5 dm. l., 2·5 cm. br., linear-oblong, slightly curved, puberulous with adpressed hairs. *Seeds* black, 1·5 cm. l., or "dirty-white" (Macfadyen).

20. PHASEOLUS L.

Herbs, sometimes woody at the base, twining or erect. Leaves pinnately 3-foliolate, stipellate ; stipules persistent, ribbed. Flowers clustered at node-like thickenings along the rhachis of a raceme. Bracts generally caducous, stipule-like or very small ; bracteoles often broader, sometimes persistent for long. Calyx campanulate, teeth 4, shorter than the tube. Standard roundish ; keel prolonged into a long beak, forming a complete spiral. Uppermost stamen free, the rest united ; anthers uniform. Style thickened within the beak of the keel and twisted with it, hairy longitudinally on the inside above ; stigma oblique or lateral. Pod compressed or sub-cylindrical, beaked, with a slight amount of tissue between the seeds.*

* We have transferred the two species, *P. peduncularis* and *P. antilanus*, to the genus *Vigna*, as they show no indication of the complete spiral twist of the keel, which seems to be the only character that differentiates the two genera.

Species 150, dispersed through the tropics, subtropics, and southern Europe.

- Calyx 4-toothed. Leaflets ovate to ovate-rhomboid.
- Corolla 1·5–2 cm. l. Lateral teeth of calyx triangular, not falcate.
- Bracteoles much shorter than the calyx. Pod, upper margin recurved, lower broadly rounded 1. *P. lunatus*.
- Bracteoles longer than, or equaling, the calyx.
- Pod oblong-linear, upper margin straight or slightly recurved 2. *P. vulgaris*.
- Corolla 2–2·5 cm. l. Lateral teeth of calyx lanceolate-falcate 3. *P. adenanthus*.
- Calyx 5-toothed. Leaflets ovate-lanceolate to linear..... 4. *P. lathyroides*.

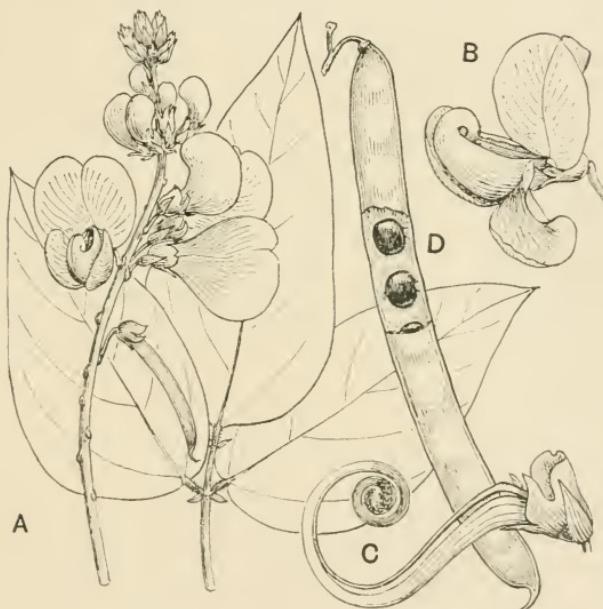


Fig. 20.—*Phaseolus adenanthus* G. F. W. Mey.

A, Small leaf and raceme $\times \frac{2}{3}$.

B, Flower, one of the wings pulled back, nat. size.

C, Bracteole, calyx, and stamens enclosing the pistil $\times 1\frac{1}{2}$.

D, Pod with two seeds exposed $\times \frac{2}{3}$.

§ 1. Calyx campanulate, 4-toothed, upper tooth broad, short, truncate or broadly rounded, sometimes slightly emarginate Leaflets ovate to ovate-rhomboid.

1. *P. lunatus* L. Sp. Pl. 724 (1753); inflorescence short-stalked, shorter than the leaves; bracteoles much shorter than the calyx; corolla 1–1·5 cm. l.; upper margin of pod generally recurved, lower margin broadly rounded, to about 2 cm. br.—Wight Ic. t. 755; Benth. in Fl. Bras. xv. pt. 1, 181; Griseb. Fl.

Br. W. Ind. 196; *Bak. in Hook. f. Fl. Br. Ind.* ii. 200; *Urb. Synb. Aut.* iv. 308; *Dundop in W. Ind. Bull.* xv. 29. *P. maximus* perennis semine &c. *Sloane Cat.* 66 & *Hist.* i. 175, t. 111, f. 1. *P. perennis* angustifolius &c. *Sloane Cat.* 67 & *Hist.* i. 176, t. 111, f. 2. *P. major* perennis &c. *Sloane Cat.* 67 & *Hist.* i. 176, t. 112, f. 1, 2, 3. *P. scandens* . . . quadrispermibus, *P. scandens* . . . radiatus, and *P. maximus* perennis &c. *Browne Hist. Jam.* 292, 293. *P. inamoenus* *L. loc. cit.* (1753); *Jacq. Hort. Vindob.* t. 66. *P. rufus* *Jacq. op. cit.* t. 34 (1770). *P. bipunctatus* *Jacq. op. cit.* t. 100. *P. foecundus* *Macf. Jam.* i. 281 (1837) (Prolific or Hibbert Bean). *P. saccharatus* *Macf. Jam.* i. 282 (Sugar Bean). *P. latisiliquus* *Macf. loc. cit.* (1837) (Broad Bean). *P. limensis* *Macf. Jam.* i. 279 (1837) (Lima Bean, White Bean). *P. parviflorus* *Stokes Bot. Mat. Med. iv.* 18 (1812). Jacquin's specimens of *P. rufus* and *P. bipunctatus* from *Hort. Vindob.* are in *Herb. Mus. Brit.*

Spontaneous and cultivated; *Sloane Herb.* iii. 62, 63, 64! *Wright!* *Macfadyen*; *Prior*.—Cultivated everywhere and often naturalized in tropical and subtropical regions.

Stem perennial, twining, at first downy, soon glabrescent. Leaflets broadly ovate-rhomboid to narrowly ovate-acuminate, lateral unsymmetrical, usually 6–7 cm. l. Racemes lax, many-flowered, to 15 cm. l., the lower thickenings distant, each with 2–4 flowers; pedicels longer than the calyx, finally 5–8 mm. l. Bracteoles 1·5–2 mm. l. Calyx 3–4 mm. l.; teeth much shorter than tube, upper tooth truncate, lateral deltoid, lower tooth triangular, acute. Corolla greenish-white. Pod 2–4-seeded, 4–7 cm. l. Seeds variable in form and colour, red, white, black, or speckled.

2. *P. vulgaris* *L. Sp. Pl.* 723 (1753); inflorescence subsessile, much shorter than the leaves; bracteoles longer than the calyx, or sometimes nearly equal; corolla about 1·3 cm. l.; pod oblong-linear, upper margin straight or slightly recurved, to 1·3 cm. br. (sometimes 2 cm. br.).—*Benth. tom. cit.* 182; *Griseb. loc. cit.*; *Bak. loc. cit.* *P. nanus* *L. Cent. Pl.* 23 (1755); *Amœn. iv.* 284; & *Sp. Pl. ed. 2*, 1017; *Macf. Jam.* i. 283 (Dwarf Kidney Bean). *P. saccharatus* *Stokes Bot. Mat. Med. iv.* 16 (1812)? *P. gonospermus* *Savi in Mem. Phas.* iii. 21, f. 19 (1824 or 1825); *Macf. Jam.* i. 280 (1837) (Hibbert Pea)? *P. compressus* *DC. Prodr. ii.* 392 (1825); *Macf. Jam.* i. 283 (Dutch Runner). *P. dumosus* *Macf. Jam.* i. 279 (1837) (Year Bean).

Spontaneous and cultivated; *Macfadyen*.—Widely spread, cultivated, and often naturalized, in tropical and subtropical regions.

A subglabrous annual. Stem twining, 6–10 ft. high (*P. vulgaris* *L.*), or suberect and low (*P. nanus* *L.*). Leaflets ovate, acuminate, lateral unsymmetrical, 4–20 cm. l.; stipules triangular, 4 mm. l., stipels linear, 4 mm. l. Racemes lax, few-flowered; pedicels longer than the calyx, finally 6–8 mm. l. Bracteoles oblong, ribbed, persistent, about 6 mm. l. Calyx 3–4 mm. l., upper tooth truncate, 3 lower teeth ovate, apex rounded. Corolla white, or lilac-purple, or pinkish or yellowish. Pod 4–6-seeded,

10–15 cm. l. Seeds ovoid-oblong, variable in colour. This is the Kidney Bean or Haricot; the dwarf variety (*P. nanus* L.) is the Bush Bean, Dwarf Kidney Bean of Jamaica.

3. *P. adenanthus* G. F. W. Mey. *Prim. Fl. Esseq.* 239 (1818); inflorescence with numerous thickenings (to 20) somewhat close, on the rhachis near the top of the peduncle, sometimes crowded at the top into a head, usually shorter than the leaves; bracteoles shorter than the calyx; corolla 2–2·5 cm. l.; pod linear, recurved, sometimes somewhat straightish, somewhat torulose, 8–1·2 cm. br.—*Griseb. loc. cit.*; *Bak. loc. cit.*; *Urb. Symb. Ant.* iv. 308. *P. truxillensis* H. B. & K. *Nov. Gen. & Sp.* vi. 451 (1823); *Benth. tom. cit.* 186. *P. amenus* Soland. ex Forst. f. *Prodr.* 91 (1786); *Plants of Cook's First Voyage, Ic. pict. ined.*; *Macf. Jam. i.* 278. *P. rostratus* Wall. *Pl. As. Rar. i.* 50, t. 63 (1830); *Wight Ic. t.* 34. (Fig. 20.)

Wright! Port Royal Mts.; St. John's Hills; near Savanna la Mar, Macfadyen; *Distin!* *Prior*; *March!*—Cosmopolitan in the tropics.

A subglabrous perennial. Stem twining. Leaflets ovate or ovate-elliptical, 7–12 cm. l. Racemes with a few showy flowers; pedicels very short. Bracteoles oblong, nerved, 3–4 mm. l. Calyx-tube broadly campanulate, about 4 mm. l., upper tooth very broad, truncate, emarginate, lateral lanceolate-acuminate, falcate, 3–3·5 mm. l., lower lanceolate-linear, 2·5–3 mm. l. Corolla fragrant, purple or red, sometimes variegated with white and yellow; standard roundish, emarginate, 2–2·4 cm. l. and br.; keel making a complete spiral. Pod, with many (10–15) seeds, usually about 10 cm. l.

§ 2. Calyx tubular, 5-toothed, teeth nearly equal in length. Leaflets linear or lanceolate to ovate-elliptical; lateral scarcely unsymmetrical.

4. *P. lathyroides* L. *Sp. Pl. ed. 2*, 1018 (1763); inflorescence a raceme with the clusters of flowers distant along the rhachis near the apex of the peduncle, longer than the leaves; bracteoles much shorter than the calyx; pod subcylindrical, linear, straightish or slightly curved, 2–3 mm. br.—*Sw. Obs.* 280; *Macf. Jam. i.* 284; *Urb. Symb. Ant.* iv. 310. *P. subhirsutus* &c. *Pluk. Phyt. t.* 214, f. 2 (excl. pods), *Alm.* 290. *P. erectus lathyroides* &c. *Sloane Cat.* 71 & *Hist. i.* 183, t. 116, f. 1. *P. minor erectus* &c. *Browne Hist. Jam.* 291. *P. semierectus* L. *Mant.* 100 (1767); *Jacq. Ic. Pl. Rar. t.* 558; *Bot. Reg. t.* 743; *Benth. tom. cit.* 189; *Griseb. op. cit.* 197; *Bak. tom. cit.* 201. *P. psoraleoides* *Wight & Arn. Prodr.* 244 (1834); *Wight Ic. t.* 249. Types in *Herb. Mus. Brit.*

Savanna, St. Jago de la Vega, *Sloane Herb.* iii. 84! *Browne*; *Wright!* *Swartz!* *Distin!* *Prior*; roadsides, *Jenman!* King's House, J.P. 1357, *Morris!* Hope grounds, *Harris!* Kingston, *Rotlrock*; Port Morant, *Hitchcock*; Porus, *Lloyd*.—Tropical America, India, Malaya.

Rhizome perennial, or in cultivated ground the root annual (fide

Benth.). Stem erect, a foot or more high, shrubby at base, with whitish deflexed hairs. Leaflets 3-7 cm. l. Racemes 7-12 cm. l.; peduncles 1·5-3 dm. l.; pedicels very short, geminate. Bracts and bracteoles bristle-like, deciduous; bracts 6 mm. l., bracteoles 3 mm. l. Calyx 4-6 mm. l.; teeth much shorter than the tube, upper triangular, lower lanceolate, awned. Corolla blood-coloured; standard about 1·5 cm. l., concave, narrowed at the base, pale red; wings about twice as long as the standard, deep crimson; keel whitish. Pod spreading, many-seeded, 8-10 cm. l. Seeds ellipsoidal, brown.

The Linnean species *P. lathyroides* is based on the Jamaican specimens of Sloane & Browne, which have narrow leaves; this form is distinguished by Bentham as *P. semierectus* v. *angustifolia*. The typical *P. semierectus* (Plukenet in Herb. Sloane xvii. 84 in Herb. Mus. Brit.) has ovate-elliptical leaves. Both forms occur in Jamaica. Plukenet's specimen has the leaves and pods of this species, and also the pods of apparently *P. Mungo* L., and these pods of another species have been drawn in Plukenet's figure as attached to the leafy twig.

21. VIGNA Savi.

Herbs, twining, prostrate or erect. Leaves pinnately 3-foliate; stipules sessile or produced at the base below the insertion (*V. unguiculata*); stipels persistent. Peduncles axillary, bearing racemes or capitate umbels of flowers, the flowers springing from thickenings on the rhachis. Calyx campanulate, 4-5-lobed or toothed. Standard roundish, auricles folded upwards; keel incurved, not beaked, or the beak not forming a complete spiral. Uppermost stamen free, the rest united; anthers uniform. Style with a row of hairs near the apex; stigma lateral or oblique. Pod straightish, subcylindrical or compressed, with a thin layer of tissue in which lie the seeds.

Species about 33, growing in the tropics.

[Stipules produced at the base below the insertion..... *V. unguiculata*.] Stipules sessile.

Flowers crowded close together at the tip of the peduncle. Corolla yellow..... 1. *V. repens*.

Flower clusters more or less distant, forming a raceme. Corolla purplish

Calyx, lateral teeth triangular, not falcate 2. *V. peduncularis*.

Calyx, lateral teeth lanceolate-falcate 3. *V. antillanus*.

[*V. unguiculata* Walp. Rep. i. 779 (1842); stipules produced at the base below the insertion.—*V. catjang* Walp. in Linnæa xiii. 533 (1839); *Bak.* in Hook. f. Fl. Br. Ind. ii. 205. *V. sinensis* Endl. ex Hassk. Pl. Jav. Rar. 386 (1848). *Phaseolus erectus* major... semine rubro Sloane Cat. 71 & Hist. i. 183, t. 115, f. 2 & 3 (Red Peas). *P. erectus* minor semine spherico albido hilo nigro Sloane Cat. 72 & Hist. i. 184, t. 117 (Calavances). *P. erectus*... seminibus rufescensibus oblongis Browne Hist. Jam. 292 (Calavances or Red Peas). *P. erectus*... hilo nigro notatis Browne loc. cit. (Black-eyed Pea). *P. erectus*...

seminibus oblongis albidis *Browne loc. cit.* (Cuckold's Increase). *Dolichos unguiculatus L. Sp. Pl.* 725 (1753); *Jacq. Hort. Vindob. i. t. 23*; *Macf. Jam. i. 287* (Cuckold's Increase). *D. sinensis L. Amoen. ir.* 326 (1759); *Jacq. op. cit. iii. t. 71*; *Bot. Mag. t. 2232*. *D. sesquipedalis L. Sp. Pl. ed. 2*, 1019 (1763); *Jacq. op. cit. i. t. 67*; *Macf. Jam. i. 288* (*Asparagus Bean*). *Phaseolus sphaerospermus L. Sp. Pl. ed. 2*, 1018 (1763). *D. catiang L. Mant.* 269 (1767). *D. sphaerospermus DC. Prodr. ii.* 400 (1825); *Macf. Jam. i. 289* (*Black-eyed Pea*).

Cow Pea, China Pea.

Sloane Herb. iii. 80-83! *Browne*; *Macfadyen*.—Tropical and subtropical regions of the whole world.

Stem, low and suberect (*V. catiang*) or tall and twining (*V. sinensis*), glabrous or nearly so. *Leaflets* very variable in size and form, 4-13 cm. l., terminal broadly ovate to lanceolate, sometimes somewhat lobed at the base, lateral very unequal-sided, somewhat triangular; *stipules* broadly lanceolate, acuminate, 10-12 mm. l., produced at the base into a linear-lanceolate appendage, 4-7 mm. l.; *stipels* 3-4 mm. l. *Flowers* 4-6, crowded at the apex of a long stalk, subsessile. *Calyx* glabrous, usually 7-8 mm. l., segments lanceolate or deltoid, acuminate. *Corolla* greenish-yellow and purplish, usually more than 2 cm. l. *Pods*, usually 1 or 2 only at the end of the long stalk, variable in length, 1-4·5 dm. l., 7-1 cm. br. *Seeds* reddish-buff or white.]

1. *V. repens* *Kuntze Rev. Gen. Pl. i. 212* (1891); stipules sessile; inflorescence with a few flowers crowded close together at the apex of the peduncle; calyx 4-toothed; corolla yellow; pod subcylindrical, about 6 mm. br.—*Urb. Symb. Ant. iv. 311*. *V. luteola Benth. in Fl. Bras. xv. pt. 1, 194, t. 50, f. II.* (1859); *Griseb. Fl. Br. W. Ind.* 195. *Dolichos maritimus minor repens* &c. *Browne Hist. Jam.* 293. *D. repens L. Syst. ed. 10, 1163* (1759), *Amoen. v. 402*, & *Sp. Pl. ed. 2, 1022*. *D. luteolus Jacq. Hort. Vindob. i. 39, t. 90* (1770). *D. luteus Sw. Prodr.* 105 (1788) & *Fl. Ind. Occ.* 1246; *Macf. Jam. i. 287*. (Fig. 21.) Specimen from Jacquin Hort. Vindob. in Herb. Mus. Brit. A specimen in Herb. Linn. has a ticket attached with Jacquin's name written by himself.

Marshy places on the sea-shore; St. George, *Browne*; *Wright!* *Broughton!* *Swartz*; *Macfadyen!* *Distin!* near Annotto Bay, St. George, *McNab!* *March!* Rock Fort; Ferry; *Campbell!* Kingston; Port Morant; Lucea; *Hitchcock*; near Kingston, *Fawcett!* Ferry; north coast; Green Island; *Harris!* *Fl. Jam.* 6117, 6309, 8188, 9260, 10,249.—Bermuda, southern U.S.A., Bahamas, tropical America.

Stem trailing or twining, usually glabrous, occasionally pubescent. *Leaflets* very variable in size and form, broadly ovate to lanceolate, lateral somewhat unsymmetrical, 1·5-8 cm. l., 6-6·5 cm. br.; *stipules* ovate or lanceolate, acuminate, 3-3·5 mm. l., *stipels* lanceolate, 2-2·5 mm. l. *Calyx* 4-5 mm. l., in the opening flower upper lobe very broad, rounded, entire or with two small mucros at apex; lateral triangular, acute; lower lanceolate, awl-shaped. *Standard* subemarginate, with 2 calli near the base, 1·5 cm. l., 1·5-1·7 cm. br., auricles small; wings

about as long as the standard, .7 cm. br., semicircular-elliptical, with an auricle above the short claw; keel a little shorter than the standard, .6 cm. br., semicircular, apex rounded. Pod pubescent with adpressed hairs or glabrate, about 6 cm. l. Seeds about 10, black, .5 cm. l.

V. vexillata A. Rich. is reported from Jamaica in Fawc. Fl. Pl. Jam. 10, but there is no specimen in the Jamaican Herbarium to confirm the entry,

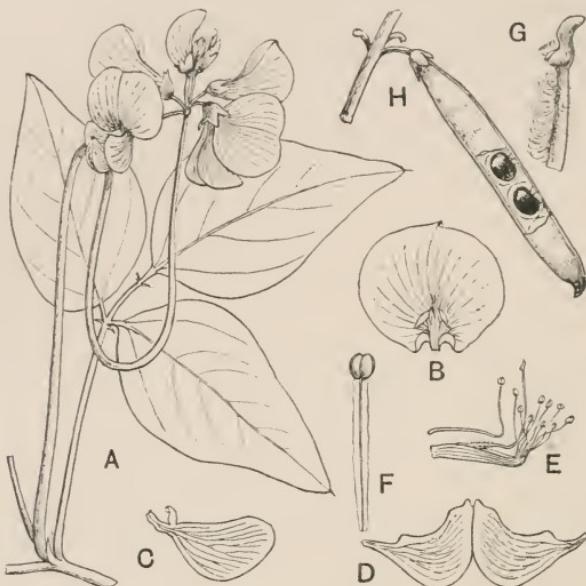


Fig. 21.—*Vigna repens* Kuntze.

A, Leaf and inflorescence $\times \frac{2}{3}$.
B, Standard $\times 1\frac{1}{2}$.
C, Wing $\times 1\frac{1}{2}$.
D, Keel $\times 1\frac{1}{2}$.
E, Stamens and pistil $\times 1\frac{1}{2}$.

F, Upper portion of stamen $\times 5$.
G, Upper portion of style with the stigma $\times 5$.
H, Pod cut open to expose seeds $\times \frac{2}{3}$.

although it is quite likely that it may occur, as its distribution in the West Indies is Cuba, Hispaniola, Porto Rico, St. Vincent, Grenada, and it is found in the tropics generally. It differs from *V. repens* in the umbellate inflorescence, calyx 5-toothed, and the pod with longer straighter beak. A specimen in Herb. Edinb. labelled "Phaseolus vexillatus—Jamaica," is *V. repens*.

2. *V. peduncularis* comb. nov.; leaflets ovate to triangular-ovate acuminate; stipules sessile; inflorescence a raceme with the clusters of flowers somewhat distant on the rhachis near the apex of the peduncle; bracteoles shorter than the calyx; calyx 4-toothed, lateral teeth triangular, not falcate; corolla 2 cm. l.; pod narrowly linear, nearly straight, to 5 mm. br.—P. peduncularis H. B. & K. Nov. Gen. & Sp. vi. 447 (1824); Benth. tom. cit. 184.

Near Priestman's River, Harris! Fl. Jam. 5979.—Panama and tropical S. America.

Stem twining, pubescent, at length glabrous. *Leaflets* 2–5 cm. l. *Racemes* 2–6 cm. l., peduncles 1–2 dm. l. and sometimes much longer; pedicels very short. *Bracts* and *bracteoles* oblong-elliptical, ribbed, deciduous; bracts 1·5 mm. l., bracteoles 3 mm. l. *Calyx* 4 mm. l.; teeth ciliate, upper tooth rounded, emarginate, lower teeth ovate, apex rounded or obtuse. *Corolla* purple; standard about 1·5 cm. l., wings about 2 cm. l., keel somewhat in the form of the letter S. *Pod* 6–10 cm. l. *Seeds* brownish, about 2 mm. l.

3. *V. antillana* comb. nov.; leaflets triangular to ovate-oblong; stipules sessile; inflorescence a raceme with few clusters of flowers distant on the rhachis near the apex of the peduncle; bracteoles much shorter than the calyx; calyx 4-toothed, lateral teeth lanceolate-falcate; corolla 2–2·5 cm. l.; pod linear, straightish, with thickened margins, to 5 mm. br.—*Vigna unguiculata* Griseb. in Mem. Acad. Amer. Sc. & Art. n. ser. viii. 178 (1860) & Cat. Cub. 76 (non Walp.). *V. sinensis* Rolfe in Kew Bull. 1893, 247 (in part) (non Endl.). *Phaseolus antillanus* Urb. Symb. Ant. iv. 309 (1905) & vi. 103. *P. unguiculatus* Piper in Torreya xii. 190 (1912).

C. V. Piper bases his name for the species on the supposed identity of Linnaeus's original specimen of *Dolichos unguiculatus* with the plant described by Urban as *Phaseolus antillanus*, but there is no specimen so named by Linnaeus in his Herbarium, nor from the evidence of his own lists does it appear that there ever was one. Further there is no specimen that agrees with *Phaseolus antillanus* Urb.

March (fide Urban).—Cuba, Hispaniola, Porto Rico, Martinique, St. Vincent.

Stem twining, with a length of over 20 ft., with few scattered hairs. *Leaflets*, terminal triangular to ovate-oblong, acuminate, 5–7 cm. l., lateral very unequal-sided, obliquely ovate, base subtruncate, membranous, with a few short hairs or subglabrous. *Raceme* about 1 dm. l.; peduncle 1–3 dm. l.; pedicels 1–2 mm. l., in fr. to 4 mm. l. *Bracts* minute, roundish, 1 mm. l. *Bracteoles* elliptical, ribbed, about 3 mm. l. *Calyx*: tube campanulate, about 4 mm. l.; upper tooth short, truncate or scarcely emarginate, lateral a little shorter than the tube, lower triangular, slightly shorter than the lateral. *Corolla* apparently purplish; standard broadly ovate, not or scarcely emarginate, about 2 cm. l., and 1·7 cm. br. below; wings 1·8–2·5 cm. l.; keel at $\frac{1}{3}$ of its length, 5–7 mm. br. and then bent at right angles, above narrowing and forming a tube at the apex. *Pod* 8–13 cm. l. *Seeds* brown with black markings, about 4 mm. l.

[PACHYRRHIZUS DC.]

Twining herbs. Leaves pinnately 3-foliate. Flowers blue, clustered-racemose. Calyx 4-lobed, lobes subequal, upper emarginate. Standard roundish-ovate, auricled at the base. Uppermost stamen free, the rest united. Style compressed above and hairy: stigma subglobose on the inner face. Pod compressed, transversely impressed outside and with tissue inside between the seeds.

Species 3, of which two are widely dispersed in the tropics of

America and Asia, indigenous, or cultivated on account of its edible, tuberous root.

P. tuberosus Spreng. *Syst. iv. Cur. Post.* 281 (1827); *Kew Bull.* 1889, 17; *Oliv. in Hook. Ic. Pl. t.* 1843; *Jam. Bull.* 1893, 44. *Phaseolus radice tuberosa* &c. *Plum. Cat.* 8 & *Pl. Amer. (Burm.) t.* 220. *Dolichos tuberosus* Lam. *Encyc. ii.* 296 (1786); *Macf. Jam. i.* 285; *Descourt. Fl. Ant. viii.* 127, *t.* 554.

Yam Bean.

Cultivated, and possibly native, in Jamaica, some other W. Indian Islands, and tropical S. America; probably native in S. America.

Stem 10-20 ft. with a large tuberous root. Leaflets, 10-17 cm. l. and br., terminal rhomboid, shortly acuminate, lateral very unsymmetrical, somewhat triangular, mostly entire. Inflorescence, clusters of 2 or 3 flowers, more or less crowded along the upper part of the long stalk. Calyx about 1 cm. l. Corolla white, 1·5 to nearly 2 cm. l.; 2 calli at base; auricles turned up on the standard and the inner edge folded outwards; claw short; wings as long as the standard, the auricle with an awl-shaped or tail-like projection; keel a little longer than the wings, auricle very small, tooth-like, a pocket-like fold on the outside near the auricle. Pod 2 dm. l., about 2 cm. br., 6-8-seeded, with reddish hairs; beak 3 cm. l., sharply triangular. Seeds 1·3 cm. l., 1 cm. br., generally red.

The tuberous roots afford a plentiful supply of wholesome food; the produce of three plants is usually a bushel; the young pods are used like French Beans. For further information see Macfadyen and *Jamaica Bulletin (loc. cit.)*.

P. erosus Urb. (*P. angulatus* L. C. Rich.) is also cultivated in some of the W. Indian Islands (though not in Jamaica) as well as in the tropics of the Old World. It differs in the leaflets with angular lobes, the flowers violet-coloured, and the pods about half the length of those of *P. tuberosus*.]

[DOLICHOS L.]

Shrubby twining herbs with the habit of *Phaseolus*. Leaves pinnately 3-foliate. Flowers clustered at node-like thickenings along the rhachis of a raceme; peduncle long, bearing a leaf. Calyx campanulate, shortly 4-lobed. Standard transversely elliptical, with a large 4-lobed callus extending from the middle to the base, forming a small auricle on each side; keel curved at a right angle. Uppermost stamen free, the rest united; anthers uniform. Style flattened upwards, narrowed at the base, hairy along the upper edge below the terminal stigma. Pod compressed, oblong, slightly recurved, beaked, 2-4-seeded, with some tissue between the seeds.

Species about 30, natives of the tropics.

D. lablab L. *Sp. Pl.* 725 (1753); *Benth. in Fl. Bras. xv. pt. 1,* 197, *t.* 51, *f.* II.; *Griseb. Fl. Br. W. Ind.* 196. *Phaseolus maximus* perennis floribus &c. *Sloane Cat.* 67, 68 & *Hist. i.* 177, *t.* 113. *Lablab vulgaris* Savi *Diss.* 19, *t.* 19, *f.* 8 (1821); *Macf. Jam. i.* 290; *Urb. Symb. Ant. iv.* 312. Type in *Herb. Linn.*

Bonavist Bean, Lablab Bean.

Sloane Herb. iii. 65! Macfadyen; Hopewell wood, St. Mary, McNab! Prior; Resource, Blue Mts., J. P. 1254 Hart! also Harris! Hope grounds, Harris! Fl. Jam. 5594, 10,801; Port Antonio, Hitchcock.—Widely cultivated, and often naturalized, in the tropics; native country probably tropical Africa.

A wide-climbing perennial. Leaflets ovate-deltoid, lateral somewhat unsymmetrical, generally 7–12 cm. l. Racemes lax, 8–16 cm. l., at the top of a strong stalk. Bracteoles 4 mm. l., broadly elliptical, deciduous. Calyx 6–8 mm. l., densely hairy on margin between the lobes. Corolla white, purple, or violet; standard nearly 1·5 cm. l., breadth exceeding 1·5 cm.; wings somewhat triangular, with an auricle above the long claw, as long as the standard. Pod rough with warty projections along the margins (at any rate in the younger pods), 4–8 cm. l., 1·8–2 cm. br. Seeds white, whitish-red, dark purple, or black.

"Planted for food as well as ornament" (Sloane). "The bean is very coarse, scarcely ever cultivated, and seldom made use of, except in times of scarcity" (Macfadyen).]

§ 9. Herbs or shrubs, erect or twining. Leaves pinnately 3-foliolate or subdigitately 1–3-foliolate; leaflets with glandular dots beneath, without stipels. Flowers in racemes. Uppermost stamen free. Pod 2-valved.

[CAJANUS DC.]

An erect undershrub. Leaves pinnately 3-foliolate; leaflets with minute resinous dots underneath. Racemes axillary. Calyx: upper 2 lobes united higher up than the rest. Standard roundish, auricled at the base. Uppermost stamen free, the rest united. Style thicker above the middle; stigma terminal, oblique. Pod compressed, marked outside with oblique depressed lines between the seeds, with indications inside of partitions.

Species 1, widely cultivated throughout the tropics, probably a native of the Old World.

C. cajan Millsp. in *Field Columb. Mus. Bot. Ser. ii.* 53 (1900).
C. indicus Spreng. *Syst. iii.* 248 (1826); Benth. in *Fl. Bras. xv. pt. 1*, 199; Griseb. *Fl. Br. W. Ind.* 191; Urb. *Symb. Ant. iv.* 306.
C. bicolor DC. *Cat. Hort. Monsp.* 85 (1813) & *Prodr. ii.* 406; *Bot. Reg.* 1845, t. 31; Macf. *Jam. i.* 296. *C. flavus* DC. *Cat. Hort. Monsp.* 86 (1813) & *Prodr. ii.* 406; Macf. loc. cit. *Phaseolus erectus incanus* &c. *Pluk. Phyt.* t. 213, f. 3. *Laburnum humilius* &c. Sloane *Cat.* 139 & *Hist. ii.* 31. *Cytisus fruticosus erectus ramosus* &c. Browne *Hist. Jam.* 296. *Cytisus* &c. L. *Fl. Zeyl.* 279. *C. cajan* L. *Sp. Pl.* 739 (1753); Tussac *Fl. Ant. iv.* t. 32. *C. pseudo-cajan* Jacq. *Hort. Vindob.* ii. t. 119; Wright *Mem.* 293. Type in *Herb. Hermann* in *Herb. Mus. Brit.*

Gungo Pea, Pigeon Pea, No Eye Pea.

Barham in *Herb. Sloane clxxxiv. 7!* Sloane *Herb. vi. 1!* Wright! Purdie! Gordon Town, Ball! Mavis Bank.

Campbell! Robertsfield and Resource, Blue Mts., *Harris!* Fl. Jam. 6163-7, 6603; Port Antonio, Lucea, *Hitchcock*.—Tropical and subtropical regions.

Shrub 4 to 10 or 12 ft. high, with woody trunks and branches. Leaflets narrowly elliptical to lanceolate, 4-9 cm. l. Flowers nearly 2 cm. l. Calyx about 1 cm. l., lowest lobe longer than the rest. Corolla yellow or yellow and orange; standard about 1·7 cm. l. and br., callus running up from the claw and branching, the outer semicircular passing into the auricle; wings somewhat semicircular, auricled at each side of the base, with a slender claw, as long as the standard; keel somewhat semicircular, with an infolded pocket near the base, about as long as the wings. Pod usually 5-seeded, 5-8 cm. l. The "No Eye Pea" has a corolla of a uniform yellow colour, whereas the "Gungo" or "Pigeon Pea" has the yellow corolla blotched with orange or red, and the calyx, pods and seeds are also marked with purple blotches or spots.]

22. RHYNCHOSIA Lour.

Herbs or undershrubs with minute yellow glands, twining in Jamaican species. Leaves pinnately 3-foliolate; leaflets with resinous dots underneath. Flowers solitary or geminate in racemes, simple or paniculate. Calyx: upper 2 lobes more or less united. Standard obovate or roundish, auricled at base. Uppermost stamen free, the rest united. Stigma small, terminal. Pod compressed, shortly beaked. Seeds 2 or 1.

Species 100, natives of the tropics, some outside the tropics in N. America and S. Africa.

Pods not constricted between the seeds.

Calyx about as long as the corolla..... 1. *R. reticulata*.

Calyx much shorter than the corolla.

Flowers about 6 mm. l. Pod minutely puberulous 2. *R. minima*.

Flowers about 12 mm. l. Pod hirsute..... 3. *R. caribaea*.

Pods constricted between the seeds 4. *R. phaseoloides*.

1. *R. reticulata* DC. Prodr. ii. 385 (1825); calyx slightly longer than the corolla, segments narrowly lanceolate-acuminate, much longer than the short tube; the upper two united beyond the middle; lateral shorter, lower longest; pod oblong, slightly narrowed at both ends; leaflets with yellow dots beneath.—Macf. Jam. i. 277; Benth. in Fl. Bras. xv. pt. 1, 203; Griseb. Fl. Br. W. Ind. 190; Urb. Symb. Ant. iv. 307. *Glycine reticulata* Sw. Prodr. 105 (1788) & Fl. Ind. Occ. 1251.

Houstoun! Shakspear! Macfadyen! Cambridge Hill, St. David, McNab! St. Cruz Mts., Purdie! Wilson! Mavis Bank, J.P. 1338, Hart! Robertsfield, Morris!—Cuba, Hispaniola, Mona, Porto Rico, St. Thomas, St. Cruz, St. Jan, St. Martin, St. Bartholomew, St. Kitts, Antigua, Guadeloupe, St. Vincent, S. America.

Stem, younger angled, tomentose or villose. Leaflets variable in shape and size, ovate to lanceolate or elliptical-rhomboïd, softly tomentose on both sides and prominently reticulate-veined beneath, 2-9 cm. l. Racemes many-flowered, 1-8 cm. l. Calyx 7-1·1 cm. l., tomentose or villose outside. Corolla yellow; standard obovate-elliptical, with auricles infolded at the base, ·6 to nearly 1 cm. l.; claw linear-wedge-shaped,

1·2-2 mm. l.; wings oblong with a sharp pointed auricle at the base, much shorter than the keel, claw slender, 1·5-2 mm. l.; keel oblong-elliptical, truncate at base, as long as the standard. Pod minutely tomentose, about 2 cm. l., 7-9 mm. br. Seeds roundish-kidney-shaped, dark brown with black spots, 4·5 mm. in diam.

2. *R. minima* DC. *Prodr. ii.* 385 (1825); calyx about one-half to two-thirds as long as the corolla, segments longer than the tube, upper 2 lanceolate, lateral similar but broader and shorter, lower longest, narrowly lanceolate, acuminate; pod oblong, narrowed towards the base, slightly curved; leaflets with

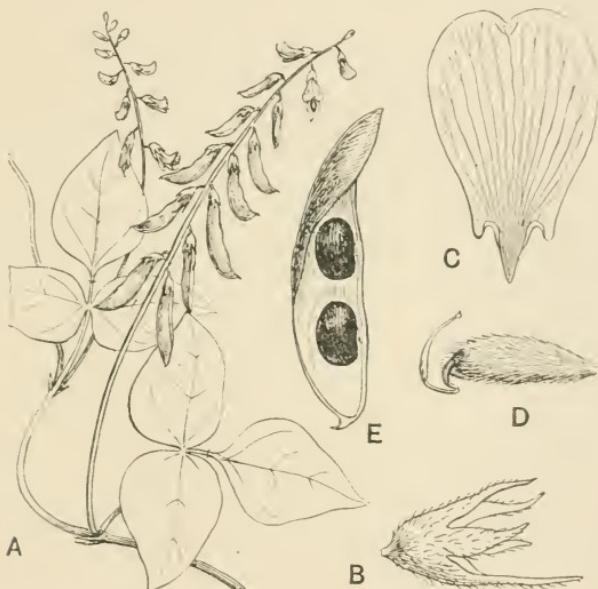


Fig. 22.—*Rhynchosia minima* DC.

A, Leaves, inflorescence, and pods $\times \frac{1}{2}$.

B, Calyx $\times 5$.

C, Standard $\times 5$.

D, Pistil $\times 5$.

E, Pod, one valve with seeds, $\times 2$.

brownish dots beneath, sometimes also on the upper surface.—*Macf. Jam. i.* 276; *Benth. tom. cit.* 204, t. 54, f. II.; *Griseb. loc. cit.*; *Urb. loc. cit.* *Phaseolus minimus fœtidus &c.* *Sloane Cat.* 71 & *Hist. i.* 182, t. 115, f. 1. *Dolichos minimus, floribus luteis* *L. Hort. Cliff.* 360, t. 21. *D. minimus L. Sp. Pl.* 726 (1753). *Dolicholus minimus Medic. in Vorles. Churpf. Phys. Ges. ii.* 354 (1787). (Fig. 22.)

Town Savanna, St. Jago de la Vega, *Sloane Herb.* iii. 79! Lane in *Herb. Sloane* clxii. 78! *Houston!* *Broughton!* *Macfadyen!* *Distin!* *McNab!* *Parnell!* *March!* Hope grounds; King's House grounds; near Lititz; Bellevue, near Spanish Town; Hope; *Harris!* Watson Hill, Fawcett! Fl. Jam. 6804, 6958, 7247, 8396, 11,913, 11,980.—Tropical and subtropical regions.

Stem angled, puberulous or glabrescent. *Leaflets* small, ovate-rhomboïd, puberulous, rarely tomentose, 1·5-2·5 (1-3) cm. l. *Flowers* distant, yellow. *Calyx* 3·3-4·5 mm. l. *Standard* about 6 cm. l., veined with red or purple, obovate with auricles at base slightly inflexed, claw wedge-shaped, about 1·3 mm. l.; wings shorter than the keel (claw 1·5 mm. l.), narrowly oblong, truncate at base; keel oblong-elliptical, rounded at apex, truncate-wedge-shaped at base, about as long as the standard and twice as broad as the wings, claw about 2 mm. l. *Pod* minutely puberulous, 2-seeded, 1·3-1·7 cm. l., 4-5 cm. br. *Seeds* ellipsoidal, slightly indented on one side, black, 2·5-3 mm. in diam.

3. *R. caribaea* DC. *Prodr. ii.* 384; calyx about one-third to one-half as long as the corolla, upper 2 segments triangular, acute, lateral ovate, acuminate, a little longer than the upper, lower segment lanceolate from a broad base, aristate, longer than the lateral; standard obovate; wings with claw-like auricle; pod hirsute; leaflets with yellow glandular dots beneath.—*Macf. Jam. i.* 275. *Glycine caribaea* Jacq. *Collect. i.* 66 (1786) & *Ic. Pl. Rar. t.* 146; *Bot. Reg. t.* 275.

There is in Herb. Mus. Brit. a description of this species from a garden plant by Solander (MSS. xv. 239), and also a specimen labelled "Hort. Kew. 1779." Jacquin's description is of a plant raised from seed brought by him "ex insulis Caribæis," and presumably the figure in *Ic. Pl. Rar.* is of the same plant. The *Bot. Reg.* states "the plant from which the drawing has been taken was raised from Jamaican seed." Macfadyen gives as its habitat, "on fences, neighbourhood of Bath." We have not seen a specimen collected in Jamaica.

Stem pubescent or glabrate. *Leaflets* small, rhomboid, acute or acuminate, puberulous with scattered hairs on the upper surface, puberulous on the nerves and veins beneath, 1·5-3 cm. l. *Flowers* "about half an inch long, deep yellow" (*Bot. Reg. t. 275*). *Standard* with purplish streaks, auriculate; keel purplish at the apex. *Pod* 2·5-3 cm. l., scimitar-shaped, with glandular dots.

4. *R. phaseoloides* DC. *Prodr. ii.* 385 (1825); calyx about one-third to one-half as long as the corolla, segments about as long as the tube, upper and lateral triangular, lower awl-shaped; pod constricted between the seeds, about 1 cm. br.; leaflets with orange-yellow dots beneath.—*Macf. Jam. i.* 276; *Benth. loc. cit. t. 54, f. i.*; *Griseb. loc. cit.*; *Urb. loc. cit.* *Glycine sylvestre scandens* &c. *Browne Hist. Jam.* 298. *G. phaseoloides* Sw. *Prodr. 105* (1788) & *Fl. Ind. Occ.* 1248.

Decoy, St. Mary, Browne; Wright! Masson! Swartz! Bancroft! Macfadyen! St. Mary, McNab! Purdie! Wilson! Moneague, Prior! J.P. 872, Morris! Chester Vale, 2000 ft.; Knapdale, near Browns Town, 1000 ft.; Mt. Diabolo; near Troy, 2000 ft.; Harris! Fl. Jam. 5636, 5875, 7093, 8494, 8775.—West Indies, Central and South America.

Stem trailing, sometimes growing to a length of 18 ft., subterete, tomentose-puberulous or glabrescent. *Leaflets* broadly ovate to rhomboid, acuminate, glabrous on upper surface, puberulous or minutely tomentose

beneath, 3-8(-12) cm. l. *Racemes* with many brownish-yellow flowers, 5-15 cm. l., sometimes branching. *Calyx* hirtellous, 3-4 mm. l., lower segment 4 mm. l. *Standard* somewhat obovate-roundish, with purplish veins, puberulous outside, and often with minute glandular dots, with minute slightly inflexed auricles at the base, .8-1 cm. l. (incl. claw, wedge-shaped, 1·6 mm. l.); wing oblong, shorter than the standard, with a triangular acute auricle (claw 2 mm. l.); keel subfalcate, almost semi-elliptical, about equal to the wings, and twice as broad (claw 2·4 mm. l.). *Pod* puberulous, especially on the edges, at length glabrate, 2-seeded, 2-2·5 cm. l., or sometimes 1-seeded, 1·5 cm. l. *Seeds* ellipsoidal, black, scarlet only round the hilum, or extending over half or the greater part of the surface, about 6 mm. in diam., somewhat like those of *Abrus precatorius*, and the plant is therefore sometimes (though wrongly) called "Wild Liquorice."

[**FLEMINGIA** Roxb.]

Erect undershrubs or shrubs, in species occurring in the West Indies. Leaves digitately 1-3-foliate; leaflets with prominent veins and glandular dots beneath. Inflorescence various; in *F. strobilifera*, flowers in small cymes, each cyme hidden by a large folded persistent bract closely and distichously arranged in axillary racemes; in *F. stricta*, flowers in dense subsessile axillary racemes, the bracts linear or lanceolate, caducous. Calyx-tube short; segments narrow, acuminate, the lowest often the longest. Standard auricled at base. Uppermost stamen free, the rest united. Stigma small, terminal. Ovules 2. Pod short, swollen.

Species about 22, natives of tropical Asia, Africa, and Australia.

- | | |
|------------------------|--------------------------|
| Leaves 1-foliate | <i>F. strobilifera</i> . |
| Leaves 3-foliate | <i>F. stricta</i> . |

1. ***F. strobilifera*** R. Br. in Ait. Hort. Kew. ed. 2. iv. 350 (1812); leaves 1-foliate; bracts, persistent, and broadly cordate.—Wight Ic. t. 267; Griseb. Fl. Br. W. Ind. 191; Bak. in Hook. f. Fl. Br. Ind. ii. 227. *Hedysarum foliis simplicibus foliolis &c. L. Fl. Zeyl.* 134, t. 3. *H. strobiliferum L. Sp. Pl.* 746 (1753). *Moghania strobilifera* St. Hil. in Desr. Journ. Bot. i. 61 (1813). Type in Herb. Hermann in Herb. Mus. Brit.

Wild Hops.

Roadsides, a weed in pastures; Hopewell, St. Mary; McNab! St. Mary, Purdie! March! J.P. 876, Morris! Dover Castle, 1800 ft., Eggers! Hope Grounds; Grove, near Hope; Stony Hill, 1000 ft.; Harris! Fl. Jam. 6974, 10,070, 11,770; Bog Walk, Hitchcock; Port Antonio, Rothrock.—East Indies, introduced in West Indies and Mauritius.

Shrub to 5 ft. and more. Leaves elliptical, narrowing to the apex, .5-2 dm. l.; petiole 1-2 cm. l. Inflorescence 5-15 cm. l. Bracts broader than long, 1·2-2·5 cm. l. Calyx 5-6 mm. l., pubescent. Standard 6·5 mm. l.; wings 5 mm. l.; keel not extending beyond the standard, but curved upwards. Pod about 1 cm. l.

2. *F. stricta* Roxb. ex R. Br. in Ait. Hort. Kew. ed. 2, iv. 349 (1812); Roxb. Corom. Pl. iii. 44, t. 248 (1819); leaves digitately 3-foliolate; bracts linear or lanceolate, caducous.—Wight Ic. t. 329; Bak. tom. cit. 228.

Purdie! J.P. 722, Jenman! near Browns Town, Harris! Fl. Jam. 7269.

Shrub with woody 3-angled branches. Leaflets lanceolate, oblong, or narrowly elliptical, acuminate, 1-3 dm. l.; petiole 3-angled, 1·5-1·5 dm. l.; stipules large, lanceolate, scarious, deciduous, 7-9 cm. l. Inflorescence 1·5-1·5 dm. l. Bracts 1·5-2 cm. l. Calyx (incl. shorter segments) about 5 mm. l., with lower segment 9 mm. l., silky. Standard 9 mm. l.; wings 7 mm. l.; keel about as long as the standard. Pod about 1·3 cm. l.]

§ 10. Trees, or shrubs with trailing or twining branches.

Leaves imparipinnate with several leaflets, sometimes only 3 or 1; leaflets without stipels (except rarely in *Lonchocarpus* and *Andira*). Flowers in axillary panicles or racemes, panicles terminal or subterminal in *Andira*. Stamens 10, all united into a sheath, split on the upper side or on both upper and lower sides, or the upper stamen more or less free, or wanting. Pod not splitting open, membranous, leathery, woody or drupaceous.

23. DALBERGIA Linn. f.

Trees, or shrubs with twining or trailing branches. Leaves alternate, with one leaflet or 3-5 (2) leaflets, imparipinnate; leaflets alternate. Flowers in axillary panicles. Calyx with 5 unequal segments, the two upper broader, the lowest longer. Standard obovate or roundish. Stamens, all united into a sheath split on the upper side, or the upper stamen free or wanting, or the sheath is split also on the lower side; anthers small, didymous, the cells opening by a chink at the apex. Ovary stalked; stigma small, terminal; ovules 2 or few. Pod not splitting open, oblong or roundish, flat, thin, with 1-4 seeds.

Species 80, growing in the tropics in America, Africa, and Asia, of which two are also found in Australia.

Leaflets one.

- Leaflets glabrous. Pod oblong, 3-4-seeded..... 1. *D. Brownei*.
- Leaflets puberulous beneath. Pod roundish, 1-seeded..... 2. *D. Ecastaphyllum*.
- Leaflets 3-5 3. *D. monetaria*.

1. *D. Brownei* Urb. Symb. Ant. iv. 295 (in Obs.) (1905); leaflets solitary, ovate-elliptical, subcordate or emarginate at base, glabrous; stalk of ovary shorter than the calyx; pod oblong or linear, 3-4-seeded, or sometimes 1-seeded.—D. Amerimnum Benth. in Journ. Proc. Linn. Soc. iv. Suppl. 36 (1860); Griseb. Fl. Br. W. Ind. 202. Amerimnon fruticosum &c. Browne Hist. Jam. 288,

t. 31, f. 3. A. Brownei Jacq. *Enum. Pl. Carib.* 27 (1760), *Sel. Stirp. Amer.* 199 & *Ed. pict.* 97, t. 263, f. 86; *Sw. Prodr.* 104 & *Fl. Ind. Occ.* 1234; *Macf. Jam.* i. 300. (Fig. 23.)

Browne! Broughton! Shaksppear! Macfadyen! Distin! Cuming! Wilson! Wullschlaegel; March! Hope, J.P. 1004, Morris! between Bath and Port Morant, Fawcett & Harris! Rock Fort, Campbell! Port Morant, Lucea, Hitchcock; near Port Antonio, MacDougal! Greenland, Mrs. Britton, 2900!—Florida Keys, Cuba, Hispaniola, central and northern S. America.

A shrubby tree, 7–10 ft. high, with branches sometimes twining. Leaflets, 4–7 cm. l. Flowers numerous, white, fragrant; panicles contracted, short, somewhat corymbose. Calyx 4–5 mm. l., sparingly pubescent-tomentose

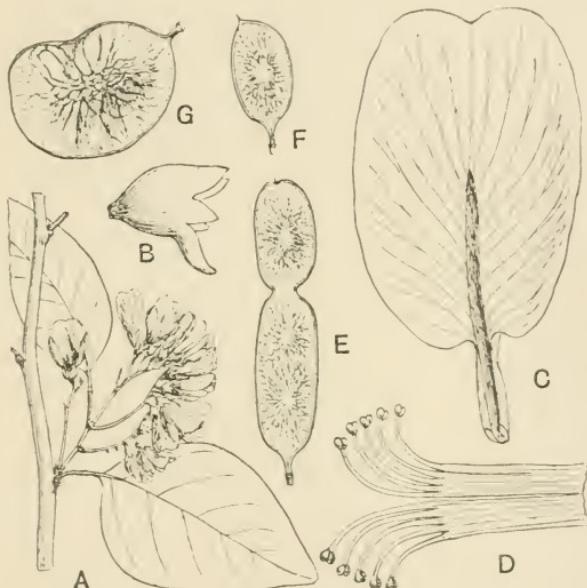


Fig. 23.—*Dalbergia Brownei* Urb.

A, Portion of flowering branch $\times \frac{2}{3}$.

D, Stamens $\times 5$.

B, Calyx $\times 3$.

E, F, Pods $\times \frac{5}{2}$.

C, Standard $\times 5$.

G, Pod of *D. Ecastaphyllum* Taub. $\times \frac{3}{2}$.

or glabrate, 2 upper segments obtuse, lateral triangular, shorter than upper and lower, lower longest, lanceolate, appearing to be awl-shaped from the margins rolled inwards. Standard obovate-obcordate-obovate nearly 1 cm. l.; wings oblong, nearly as long as the standard; keel-petals united at obtuse apex, much shorter than the wings, 5·5 mm. l. Stamens 10, sheath split above or below, or both, uppermost stamens more or less free. Pod sometimes 1-seeded, 1·3–2 cm. l., sometimes 3–4-seeded, 3·5–5 cm. l., about 1 cm. br.

2. *D. Ecastaphyllum* Taub. in *Engl.-Prantl Pflznam.* iii. pt. 3, 335 (1894) (as *ecastaphyllum*); leaflets solitary, elliptical, shortly acuminate, puberulous beneath, densely so in young leaflets; stalk of ovary longer than the calyx; pod oblique, roundish, puberulous, 1-seeded.—*Urb. tom. cit.* 294 (as *D. hecast-*

phyllum). *Ecastaphyllum frutescens* &c. *Browne Hist. Jam.* 299, *t.* 32, *f.* 1. *Hedysarum Ecastaphyllum L. Syst. ed.* 10, 1169 (1759). *Pterocarpus ecastaphyllum L. Syst. ed.* 13 (*Murray*), 533 (1774); *Berg. in Vet. Handl. Stockh.* 1769, 116, *t.* 4; *Sw. Obs. Bot.* 275. *Ecastaphyllum Brownei Pers. Syn. ii.* 277 (1807); *Macf. loc. cit.*; *Griseb. loc. cit.* (as *Hecastophyllum*); *Benth. in tom. cit.* 50 & *in Fl. Bras. tom. cit.* 228. Type in *Herb. Linn.*

Browne! *Wright!* *Distin!* *Cuming!* *McNab!* sea coast, near Turtle Crawl, Portland, *Purdie!* March; Dover, *Metcalfe!* Port Antonio, *Hitchcock*; also *Harris!* *Fl. Jam.* 5997.—Florida, West Indies, Central and S. America, western tropical Africa.

Shrub or shrubby tree, 10 ft. high. Leaflets 4–11 cm. l. Flowers numerous, white, fragrant. Calyx 3–3·5 mm. l., tomentose; segments subequal, 2 upper broad, obtuse, lateral and lower triangular, lower slightly longer than the lateral. Standard round, sometimes with retuse apex, 7 mm. l.; wings somewhat elliptical, longer than the standard; keel-petals united at the back, apex obtuse, base auriculate, 6 mm. l. Stamens 10, sheath split above and below. Pod 2–3 cm. l.; stalk 3 mm. l.

3. *D. monetaria* *Linn. f. Suppl.* 317 (1781); leaflets 3–5, sometimes 2, elliptical to roundish-elliptical, shortly acuminate, glabrous; stalk of ovary longer than the calyx; pod oval-roundish, 1-seeded.—*Urb. tom. cit.* 295. *Ecastaphyllum Richardi var. monetaria Pers. Syn. ii.* 277 (1807). *E. monetaria DC. Prodr. ii.* 421 (1825); *Griseb. loc. cit.* (under *Hecastophyllum*), *Benth. loc. cit.* & *in Fl. Bras. loc. cit. t.* 63, 64 (excl. flowering spec.). Type in *Herb. Linn.*

Morris! Castleton, *Harris!* *Fl. Jam.* 12,080.—West Indies, S. America.

Shrub or tree or with woody stems, climbing widely by means of twining branches. Leaflets 5–18 cm. l. Flowers white or yellowish-white; panicles contracted, short, somewhat corymbose. Calyx about 3 mm. l., sparsely puberulous, segments subequal, bluntly triangular, 2 upper broader. Corolla: petals of nearly equal length, about 6 mm. l.; standard round, obcordate, claw as long as the blade; wings elliptical, auriculate, long-clawed; keel-petals united near the apex, somewhat elliptical, auriculate, long-clawed, slightly shorter than the wings. Stamens 9, in two bundles of 4 and 5, and 1 of the five more or less free. Pod glabrous, 2·5–3·5 cm. l.; stalk 5–6 mm. l.

24. PTEROCARPUS Jacq.

Trees. Leaves imparipinnate; leaflets alternate or irregularly opposite. Flowers yellow, usually in panicles. Calyx unequally 5-toothed, top-shaped. Standard roundish; wings obliquely obovate, keel-petals shortly connected. All the stamens united into a sheath split above or above and below; anthers versatile. Stigma small, terminal. Pod roundish, compressed, not opening, the style lateral, 1 or 2 seeds in the middle, more or less thickened or hardened, attenuated all round the edge.

Species 20, natives of the tropics in America, Africa and Asia.

P. officinalis Jacq. *Sel. Stirp. Amer.* 283, t. 183, f. 92 (1763)
 & *Ed. pict.* t. 264, f. 91; *Urb. Symb. Ant.* iv. 296.—*P. draco*
L. Sp. Pl. ed. 2, 1662 (1763) (with reference to *Jacq.* only);

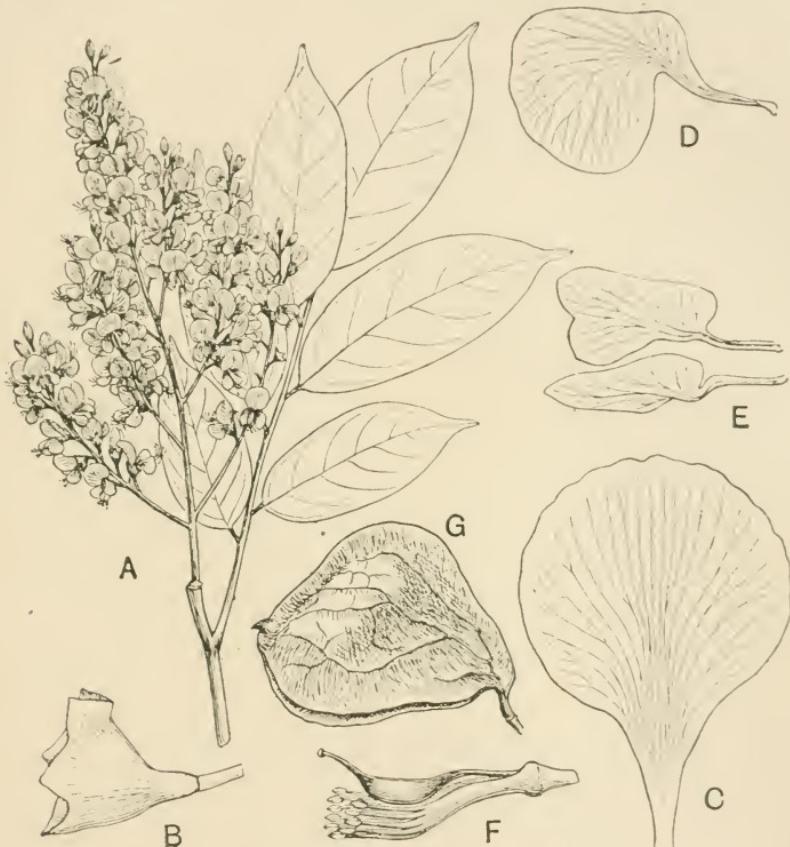


Fig. 24.—*Pterocarpus officinalis* Jacq.

A, Leaf and inflorescence $\times \frac{1}{3}$.

E, Keel-petals, the upper unfolded, $\times 4$.

B, Calyx $\times 3$.

F, Stamens and pistil $\times 4$.

C, Standard $\times 4$.

G, Pod $\times \frac{3}{4}$.

D, Wing $\times 4$.

Benth. in *Proc. Linn. Soc. iv. Suppl.* 77; Griseb. *Fl. Br. W. Ind.* 201; Wils. in *Reports Geolog. Jam.* 277. Moutouchi suberosa Aubl. *Pl. Guian. ii.* 748, t. 299 (1775). (Fig. 24.)

Manchioneal, Wilson!—Porto Rico, Guadeloupe, Dominica, St. Lucia, St. Vincent, Trinidad, central America, northern S. America.

A glabrous tree, 25–30 ft. high. Leaflets 5–9, oblong-elliptical or elliptical, shortly acuminate, shining, 5–1·5 dm. l. Panicles lax, 5–1·5 dm. l. Calyx 5–6 mm. l. Standard narrowed at the base into the long claw, 1·1–1·3 cm. l.; wings nearly as long; keel shorter than the wings. Ovary stalked. Pod shortly stalked, very oblique, veiny, about 4 cm. in diam.

Linnæus (*loc. cit.*) gives no diagnosis, he merely refers to his Mat. Med. 522 and Jacq. Hist. 283, t. 183, f. 92. *Pterocarpus* of the Mat. Med. is based on Hermann's Fl. Zeyl. 417, of which there are two specimens in Hermann's Herb., both of which, as Trimen pointed out, are *Derris uliginosa*, an Old World species; Jacquin's name applies to the American species, and also has priority over *P. Draco* L.

25. LONCHOCARPUS H. B. & K.

Trees, or high trailing shrub (*L. patens*). Leaves alternate, imparipinnate; leaflets opposite. Flowers in racemes; pedicels generally 2-flowered, sometimes 2 pedicels together. Calyx truncate; teeth 5, very short or obsolete. Standard roundish. Uppermost stamen free only just at the base, united above the base with the rest into a closed tube; anthers versatile. Stigma small, terminal. Pod flat, not opening, not winged, with 1-4 seeds.

Species 60, natives of tropical America and Africa, one Australian.

- Pedicels longer than the flowers, spreading. Pod reticulate..... 1. *L. patens*.
 Pedicels not longer than the flowers. Pod smooth.
 Flowers less than 1 cm. l. Calyx 2-2·5 mm. l. Pod thin, parchment-like 2. *L. latifolius*.
 Flowers more than 1 cm. l. Pod woody.
 Leaflets puberulous beneath. Calyx 3-4 mm. l.
 Corolla about 1·2 cm. l..... 3. *L. sericeus*.
 Leaflets glabrous. Calyx 5-6 mm. l. Corolla about 1·5 cm. l..... 4. *L. domingensis*.

1. *L. patens* Urb. *Symb. Ant.* v. 367 (1908); leaflets glabrous, nerves beneath flat; pedicels spreading, generally longer than the flowers; calyx: teeth wanting, about 4 cm. l.; corolla about 1·2 cm. l.; pod thin-parchmenty, reticulate, glabrescent, somewhat dilated and flat along the upper margin.

In fl. June, in fr. Nov.; near Troy, 2000 ft.; Mulgrave, St. Elizabeth, 1300 ft.; Harris! Fl. Jam. 8739, 9065, 12,379.

Straggling trailing shrub, growing to a length of 30 ft. Leaflets in 2-4 pairs, ovate-elliptical, elliptical or oblong, shortly and obtusely acuminate, rounded at the base, papery when dry, 4-9 cm. l. Inflorescence glabrous, lax-flowered, about as long as the leaves. Bracteoles close to the calyx, roundish or ovate-roundish, 1 mm. l. Calyx very sparingly puberulous, more so at the margin. Corolla dark rose-colour; standard roundish, apex deeply emarginate, base auriculate, silvery-silky on the outside, with shallow infolded auricles, 1·2-1·5 cm. l.; wings oblong-elliptical, with hairs along a median line and at the apex, long-clawed, 1·2-1·3 cm. l.; keel-petals oblong-elliptical, cuneate at the base, silvery-silky on the outside, long-clawed, as long as the wings. Pod irregular in outline due to the cessation of growth except around the seeds, beaked with the more or less persistent style, 1-3-seeded, 6-9 cm. l., nearly 2 cm. br. Seeds purplish-black, kidney-shaped, about 1·3 cm. l.

2. *L. latifolius* H.B. & K. *Nov. Gen. & Sp.* vi. 383 (in note) (1824); *DC. Prodr.* ii. 260 (1825); leaflets minutely puberulous beneath, nerves prominent beneath; calyx 5-toothed, 2 upper teeth closer together, 2–2·5 mm. l.; corolla 5–7 mm. l.; pod thin-parchmenty, smooth, minutely puberulous, not sensibly

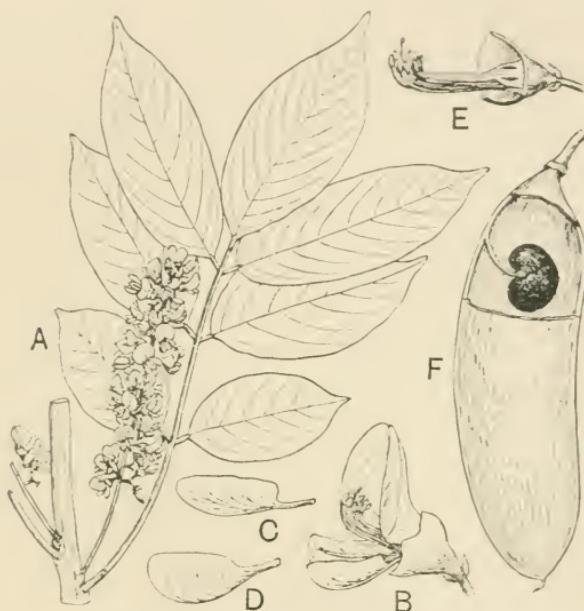


Fig. 25.—*Lonchocarpus latifolius* H. B. & K.

A, Leaf and inflorescence $\times \frac{1}{3}$.

B, Flower $\times 2$.

C, Wing from a larger flower $\times 2$.

D, Keel ditto $\times 2$.

E, Stamens enclosing the pistil, viewed from above, $\times 2$.

F, Pod, with part of a valve removed to show a seed, $\times \frac{1}{2}$.

thickened along the margins.—*Griseb. Fl. Br. W. Ind.* 199; *Benth. in Journ. Proc. Linn. Soc. iv. Suppl.* 90; *Urb. Symb. Ant.* iv. 297; *Cook & Collins in Contrib. U.S. Nat. Herb.* viii. 178. *Amerimnum latifolium* Willd. *Sp. Pl.* iii. 909 (1803). (Fig. 25.)

Dogwood (a name also given to *Piscidia piscipula*).

In fl. May–July; in fr. Sept.; Wright! Masson! Lindsay! Macfadyen! Wilson; Wüllschlaegel; Prior; J.P. 695, Jenman! Castleton Hill, 1000 ft., Thompson! sea-coast, Ferry Pen; near Lacovia; Tyre; Watson's Hill, 1200 ft.; Ipswich, St. Elizabeth; Harris! Fl. Jam. 6564, 8032, 9853, 10,812, 11,721, 12,366.—West Indies, continental America from Mexico to Guiana.

Tree 20–50 ft. high. Leaflets in 3 (2–4) pairs, oblong to elliptical, acuminate, cuneate to obtuse at base, papery, jointed to the rachis, 5–2 dm. l. Inflorescence minutely puberulous or glabrescent, shorter than the leaves, 7–12 cm. l. Bracteoles minute, lanceolate, .7 min. l. Calyx minutely puberulous. Corolla yellow, rosy, or liver-coloured; standard transversely elliptical, apex emarginate, auricles at base obsolete or wanting,

more or less silky on the outside, calli at the base small and only slightly thickened, 5-7 mm. l. (excl. claw), 7-8 mm. br., claw 1 mm. l.; wings oblong-elliptical, slightly curved, glabrous, scarcely auriculate, long-clawed, 4-5.5 mm. l. (excl. claw); claw 2 mm. l.; keel-petals semicircular-elliptical, glabrous, 4.5-5 mm. l. (excl. claw), claw 2-2.5 mm. l. Pod not or scarcely constricted between the seeds, style not persisting, 1-4-seeded, 4-9 cm. l., about 2 cm. br. Seeds liver-coloured, kidney-shaped, flat, about 1.2 cm. l., .7 cm. br.

The wood is hard, and is used for furniture in Porto Rico (Cook and Collins).

3. *L. sericeus* H. B. & K. Nov. Gen. & Sp. vi. 383 (in note) (1824); DC. Prodr. ii. 260 (1825); leaflets on the lower surface puberulous and with prominent nerves and veins; calyx 3-4 mm. l., teeth obsolete; corolla about 1.2 cm. l.—*Benth. tom. cit.* 88 (excl. vars.); Wilson in *Reports Geolog. Jam.* 277 (? = *L. dominicensis*). *Robinia sericea* Poir. Encyc. vi. 226 (1804).

Castleton Garden, J.P. 1099, *Morris!* also *Harris!* Mulgrave, St. Elizabeth, 1200 ft.; *Harris!* Fl. Jam. 9153, 12,356.—Tropical America, western tropical Africa.

Tree 20-100 ft. Leaflets in 3-5 pairs, elliptical, shortly and abruptly acuminate, rounded and sometimes almost sub-cordate at the base, leathery, upper surface shining, glabrous, 4-8 cm. l.; petioles and petiolules puberulous. Inflorescence brownish-puberulous, nearly as long as the leaves. Bracteoles close to the calyx, round, 1-1.3 mm. l. Calyx puberulous. Corolla violet-purple; standard roundish, apex emarginate, base auriculate, silvery-silky on the outside, with the lower margin thickened and inflexed, decurrent into the claw, 1.2 cm. l.; wings oblong-elliptical, with hairs along a median line and at apex, slightly curved, long-clawed, 1.2 cm. l.; keel-petals oblong-curved, truncate at the base, silvery-silky on the outside, long-clawed, as long as the wings. Pod woody, smooth, brownish-tomentose, somewhat dilated and flat along the upper margin, linear, the style persisting more or less as a curved beak, 1-5-seeded, 3-13 cm. l., 1.5 cm. br. Seeds purplish-black, oblong-kidney-shaped, about 1.3 cm. l.

4. *L. domingensis* DC. Prodr. ii. 259 (1825); leaflets glabrous with prominulous nerves and veins beneath; calyx 5-6 mm. l., teeth wanting, rarely obsolete; corolla 1.5-1.7 cm. l.—*Urb. tom. cit.* 296. *L. Turpinii* H. B. & K. *tom. cit.* 385 (1824). *L. sericeus* var. *jamaicensis* Griseb. Fl. Br. W. Ind. 200 (1860). *L. sericeus* H. B. & K. var. *glabrescens* Benth. loc. cit. & in Fl. Bras. xv. pt. 1, 277 (in part). *Dalbergia domingensis* Turp. ex Pers. Syn. ii. 276 (1807).

In fl. and fr. July; Wright! Dr. Lindsay! Distin! in rocky places, Manchester, Purdie! road to Troy, 1200 ft., *Harris!* Fl. Jam. 9491.—Hispaniola, Porto Rico, Guadeloupe, Martinique.

Tree 40-50 ft. high. Leaflets in 3 pairs, elliptical, generally shortly acuminate, 5-15 cm. l. Racemes axillary, shorter than the leaves, tomentellous or glabrous. Bracteoles small, roundish, 1-1.5 mm. l. Flowers pale rosy-violet; pedicels usually shorter than the calyx, tomentellous. Calyx strigillose. Corolla pale violet-rose; standard roundish-elliptical, apex deeply emarginate, base truncate, silvery-silky on the outside, with the lower margin thickened and decurrent into the claw, 1.6 cm. l.;

wings oblong, with hairs along a median line and at the apex, upper margin slightly curved, lower somewhat straight, long-clawed, 1·5 cm. l.; keel-petals oblong, upper margin slightly curved, lower straight, truncate at the base, silvery-silky on the outside, long-clawed, as long as the wings. Pod similar to that of *L. sericeus*, but tomentum shorter, sometimes thickened along both margins, 1-2(3)-seeded, elliptical, oblong, or linear, 3-8 cm. l., 2 cm. br., style more or less persisting as a curved beak.

26. PISCIDIA L.

Tree. Leaves alternate, imparipinnate; leaflets opposite, 3-5 pairs. Flowers appearing before the leaves in panicles. Calyx with 5 short broad teeth. Standard roundish, emarginate;

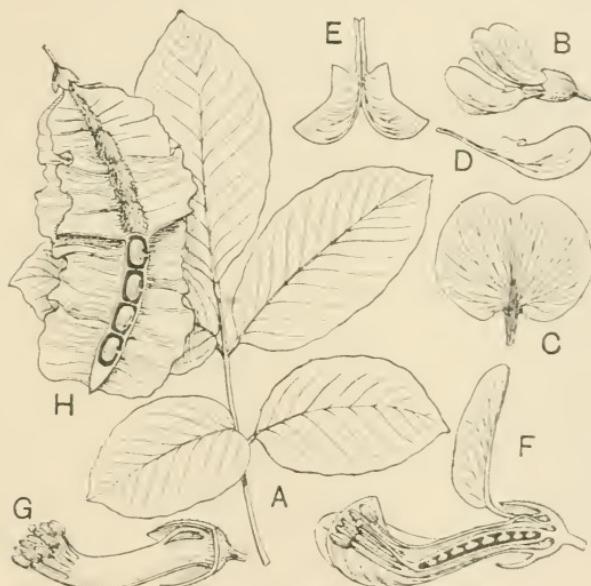


Fig. 26.—*Piscidia piscipula* Sarg.

- | | |
|----------------------------------|---|
| A, Leaf $\times \frac{1}{2}$. | F, Flower cut lengthwise $\times 1\frac{1}{2}$. |
| B, Flower $\times \frac{2}{3}$. | G, Staminal sheath enclosing pistil, and part of calyx, $\times 1\frac{1}{2}$. |
| C, Standard, nat. size. | H, Pod, with portion cut away to show seeds, $\times \frac{3}{4}$. |
| D, Wing, nat. size. | (F, G after Sargent.) |
| E, Keel, nat. size. | |

wings and keel long-clawed. Uppermost stamen free at the base, united in the middle with the rest in a closed tube; anthers versatile, attached just above the base. Stigma small, terminal. Pod linear-compressed, not opening, on a stalk longer than the calyx, with 4 broad longitudinal wings, slightly contracted between the seeds. Seeds 3-7.

Species 1, or perhaps 2, natives of the West Indies, Mexico, and northern S. America.

P. piscipula Sarg. in *Gard. & For.* iv. 436 (1891); *Urb. Symb. Ant.* iv. 297. *P. Erythrina* L. *Syst. ed.* 10, 1155 (1759); *Macf. Jam.* i. 258; *Griseb. Fl. Br. W. Ind.* 200; *Benth. in Proc. Linn. Soc. iv. Suppl.* 116. Coral arbor polyphylla &c. *Sloane Cat.* 143 & *Hist.* ii. 39, t. 176, f. 4, 5. *Robinia pedunculis* &c. *Plum. Pl. Amer. (Burm.)* 229, t. 233, f. 2. *Ichthyomethia foliis pinnatis* &c. *Browne Hist. Jam.* 296. *Erythrina piscipula* L. *Sp. Pl.* 707 (1753). *Ichthyomethia piscipula* Hitchc. in *Gard. & For.* iv. 472 (1891); *Sarg. Silva* iii. 53, t. 117, 118. (Fig. 26.) Type in Herb. Mus. Brit.

Dogwood.

In fl. Feb.-Apr.; in fr. June-Aug.; *Sloane* Herb. vi. 18! *Houstoun!* *Wright!* *Broughton!* *Shakspear!* *Distin!* *Purdie!* *March!* *Prior!* *King's House, J.P.* 1319, *Morris!* *Maiden Cay, Fawcett!* near Hope, *Campbell!* Berwick, 2500 ft.; Hope, 700 ft.; Great Goat Is., 50 ft.; *Harris!* Fl. Jam. 6502, 7707a, 7708, 8518, 9221.—Florida and Keys, Bahamas, Hispaniola, Porto Rico, St. Thomas, St. Cruz, St. Jan, St. Martin, St. Bartholomew, Antigua, Guadeloupe, St. Lucia, St. Vincent, Barbados, Grenada, Mexico.

Tree 25-30(-60) ft. high. Leaflets elliptical or oblong, minutely puberulous or glabrate on the upper surface, tomentose or minutely puberulous beneath, 4-9 cm. l. Flowers whitish with a purplish tinge, or rosy, produced in large numbers at the ends of the branches. Calyx 5-6 mm. l. Standard 1·3-1·5 cm. l.; wings and keel auriculate, about as long as the standard. Pod 4-8 cm. l.; wing 1-2 cm. br.

Well-grown trees reach a diameter of 2 or 3 feet, and the timber is considered valuable. The wood is of a light brown colour, heavy, tough and elastic; it is used for felloes of wheels, and for cart and carriage frames. It is durable in and out of water, and makes excellent piles for wharves. Posts put into the ground readily grow. "It is largely used in Florida in boat-building and for firewood and charcoal" (Sargent). The whole tree, but especially the bark of the roots, contains *piscidin*, which is sedative and hypnotic, and has been found effective in producing sleep without subsequent injurious effects. The bark of the root relieves toothache when placed in the hollow of carious teeth. A decoction of the bark of the stem cures mange in dogs. The pounded bark is thrown into streams to intoxicate fish.

27. ANDIRA Lam.

Trees. Leaves alternate, imparipinnate; leaflets opposite. Flowers purplish, sweet-smelling; panicles terminal or sub-terminal. Calyx truncate with short teeth. Standard roundish. Uppermost stamen free; anthers uniform, versatile. Stigma small, terminal. Pod drupe-like, not opening, pericarp woody. Seed 1, pendulous.

Species 20, natives of tropical America, of which one is also found in west tropical Africa.

A. inermis H. B. & K. *Nov. Gen. & Sp.* vi. 385 (in note) (1824); *DC. Prodr.* ii. 475 (1825); *Macf. Jam.* i. 323; *Griseb. Fl. Br. W. Ind.* 202; *Benth. in Proc. Linn. Soc. iv. Suppl.* 122 & in *Fl. Bras.* xv. pt. 1, 298, t. 116. *A. jamaicensis* *Urb. Symb.*

Aut. iv. 298 (1905). *Geoffræa jamaicensis* inermis Wright in *Phil. Trans. R. Soc. Lond.* lxxvii. 512, t. 10 (1778) (reprinted in *Mem.* 361); *Mem.* 69, 212, 361. *G. inermis* Wright in *London Medical Journ.* viii. 256 (1787); *Sw. Prodr.* 106 (1788) & *Fl. Ind. Occ.* 1255. (Fig. 27.)

Cabbage Bark Tree, Bastard Cabbage.

Wright! Broughton! Masson! Dr. Lindsay! Distin! St. Mary, McNab! Purdie! Wullschlaegel; Moneague, Prior! Castleton Hill, Thompson!

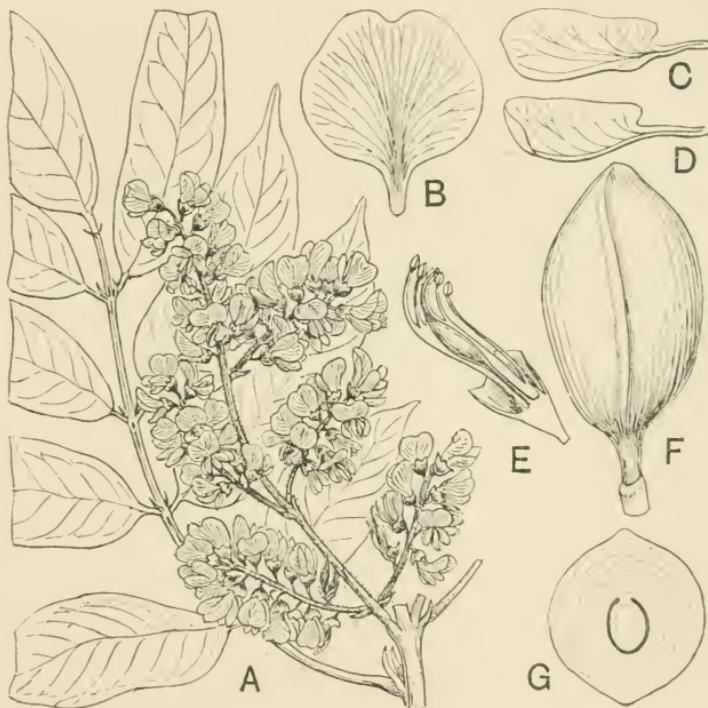


Fig. 27.—*Andira inermis* H. B. & K.

- | | |
|---|---|
| A, Leaf and portion of inflorescence $\times \frac{1}{2}$. | E, Section showing five stamens and pistil $\times 2$. |
| B, Standard $\times 2$. | F, Pod slightly reduced. |
| C, Wing $\times 2$. | G, Cross-section of ditto. |
| D, Keel-petal $\times 2$. | |

(After *Flora Brasiliensis*.)

St. George; near Castleton; Ferry River; Harris! Fl. Jam. 5592, 5902, 8017, 9053.—West Indies, tropical continental America, west Africa.

Tree 25–40(–60) ft. high. Leaflets in 4–7 pairs, oblong, acuminate, glabrous, parchment-like, 5–11 cm. l., 2·5–4 cm. br. Stipules linear, tapering, soon falling, 5 mm. l. Stipels awl-shaped, soon falling, 3 mm. l. Panicle 1·5–3 dm. l.; pyramidal, dense-flowered, much frequented by bees, butterflies, beetles, and humming birds; rhachis, pedicels, and calyx tomentose. Calyx 3 mm. l., dark purple. Corolla reddish-lilac or pale rose; standard emarginate, base truncate, sometimes subcordate, 1 cm. l. incl. the slender claw (2·5 mm. l.); wings and keel about as long as the standard. Pod ellipsoidal, about 3·5 cm. l.

The timber is small but hard and takes a good polish. "The bark of this tree has been employed as a vermifuge. It has a disagreeable smell, and a sweet mucilaginous taste. Its effects are emetic, drastic, purgative, and narcotic. In large doses it is poisonous, producing violent vomiting, with fever and delirium" (Macfadyen).

§ 11. Shrubs or trees. Leaves imparipinnate; leaflets in 4-12 pairs, opposite or nearly opposite. Stamens 10, distinct. Pod 2-valved or not splitting open.

28. SOPHORA L.

Shrub (in West Indies). Leaves imparipinnate; leaflets opposite or nearly opposite. Racemes terminal. Calyx obscurely toothed or with 5 short teeth. Standard elliptical or roundish. Stamens distinct; anthers versatile. Stigma minute, terminal. Pod much constricted between the seeds (necklace-like), many-seeded, not splitting but opening by decay.

Species 25, natives of the tropics.

S. tomentosa L. *Sp. Pl.* 373 (1753); *Macf. Jam.* i. 237; *Griseb. Fl. Br. W. Ind.* 203; *Benth. in Fl. Bras.* xv. pt. 1, 314,

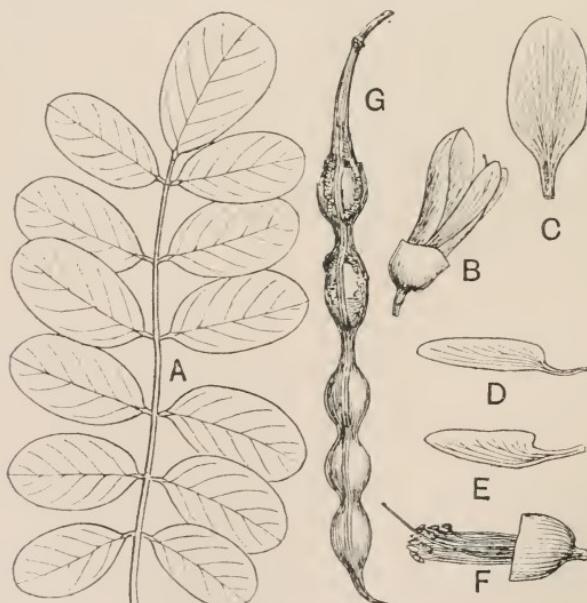


Fig. 28.—*Sophora tomentosa* L.

A, Leaf $\times \frac{1}{2}$.
B, Flower $\times \frac{2}{3}$.
C, Standard $\times \frac{2}{3}$.
D, Wing $\times \frac{2}{3}$.

E, Keel $\times \frac{2}{3}$.
F, Calyx, stamens, and pistil $\times \frac{2}{3}$.
G, Pod partially decayed above, showing seeds, $\times \frac{2}{3}$.

t. 124; *Urb. Symb. Ant.* iv. 280. *S. foliis pinnatis &c. Plum. Pl. Amer. (Burm.)* 91, *t.* 101 & *Ic. ined.* v. 294. *S. occidentalis L. Syst. ed.* 10, 1015 (1759); *Sw. Obs. Bot.* 154. Arbori Coral affinis non spinosa, fraxini folio rotundiore, foliis et ramulis pubescentibus *Sloane Cat.* 144 & *Hist. ii.* 40, *t.* 178, *f.* 3. Galega fruticosa &c. *Browne Hist. Jam.* 289, *t.* 31, *f.* 1. Type in Herb. Hermann in Herb. Mus. Brit. & in Herb. Linn. (Fig. 28.)

Seashore; *Sloane*, Herb. vi. 13! *Browne*! *Wright*! *Shakspear*! *Masson*! Port Antonio, *Macfadyen*; *Distin*! *March*! Montego Bay, *Fawcett*!—Tropical and subtropical regions.

Shrub 4-10 ft. high, more or less tomentose. Leaflets nearly opposite, in 5-9-(12) pairs, roundish-elliptical or elliptical, 2.5-4 cm. l.; stipules none. Raceme 1-4 dm. l. Flowers pale yellow. Calyx campanulate; mouth truncate, obscurely toothed, .7-1 cm. l. Standard elliptical, tapering to the base, folded lengthwise, 2-3 cm. l.; wings and keel nearly as long. Pod 5-9-seeded, .5-1.5 dm. l. Seeds subglobose, yellow or brownish, about 6 mm. l.

29. ORMOSIA Jack.

Trees. Leaves imparipinnate, leaflets opposite. Flowers generally in terminal panicles. Calyx with the 2 upper lobes to some extent united. Standard roundish. Stamens distinct,

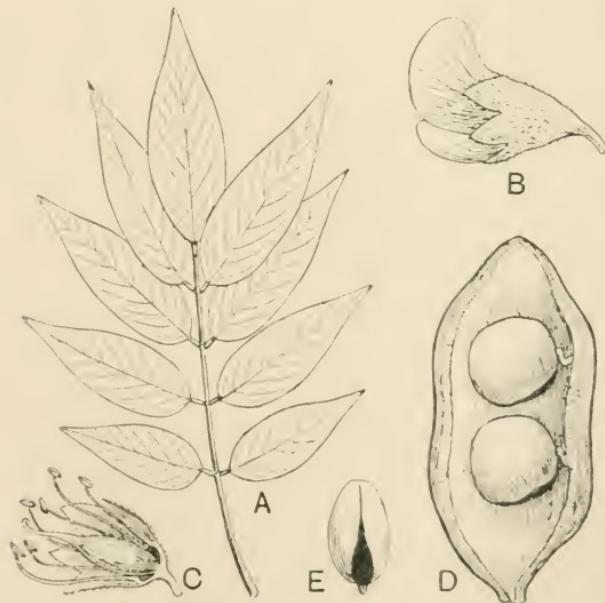


Fig. 29.—*Ormosia*.

A, Leaf of *O. jamaicensis* Urb.

B, Flower of *O. discolor* Spruce $\times 3$.

C, Ditto cut lengthwise with petals removed.

D, Valve of pod with seeds of *O. jamaicensis* Urb. $\times \frac{1}{2}$.

E, Seed from same showing black spot above hilum $\times \frac{1}{2}$.

(B. C, after *Flora Brasiliensis*.)

unequal; anthers versatile. Style with apex folded in; stigma lateral, on the inner side. Pod compressed, thick and leathery, 2-valved. Seeds few, attached by a cartilaginous flexuous stalk.

Species 20, natives of the tropics in America, Asia, and two species in Africa.

O. jamaicensis Urb. *Symb. Ant.* v. 366 (1908). (Fig. 29.)

Nickel.

Road from Askenish to Dolphin Head, and on the Dolphin slope, Harris! Fl. Jam. 9241.

A tall timber tree, with a straight trunk up to 80 ft. in height and over $3\frac{1}{2}$ ft. in diameter; head dense and leafy. Leaflets in 4(5) pairs, elliptical to oblong-lanceolate, acuminate, base obtuse or acute, 5-11 (12) cm. l., 2-3.5 (4) cm. br.; petiolule 5-6 mm. l. Peduncle 2-2.5 cm. l. fruit-bearing rhachis 6-18 cm. l. Pod glabrous, 1-seeded, 4-5 cm. l.; or 2-seeded, 6 cm. l. Seeds flattened-globose, scarlet with a black ovate-acuminate spot near the attachment, about 1.5 cm. l., and almost as broad, about 1 cm. thick.

"Nickel" is a corruption of "necklace," as the beads are used to make necklaces.

§ 12. Trees. Leaves imparipinnate, usually reduced to 1 leaflet in the Jamaican species. Calyx closed before flowering, and then bursting into 2-4 irregular segments. Petals 1 in the standard. Stamens numerous, distinct. Pod ellipsoidal or oblong.

30. SWARTZIA Schreb.

Trees. Leaves imparipinnate or reduced to 1 leaflet in *S. simplex*. Flowers racemose or solitary. Calyx closed before flowering, and then bursting irregularly. Petal 1 (standard), broad, corrugate, the rest wanting, or 2 lateral, very small, sometimes petals altogether wanting. Stamens numerous, distinct, subhypogynous. Pod leathery or fleshy, 2-valved or not opening.

Species 60, natives of tropical America and one of tropical Africa.

S. simplex Spreng. *Syst. ii.* 567 (1825); Urb. *Symb. Ant.* v. 364. *S. simplicifolia* Willd. *Sp. Pl. ii.* 1219 (1800). *S. grandiflora* Willd. *tom. cit.* 1220 (1800); Wils. in *Reports Geolog. Jam.* 277; Benth. in *Fl. Bras. xv. pt. 2,* 18; Griseb. *Fl. Br. W. Ind.* 211. *Possira simplex* Sw. *Prodr.* 82 (1788). *Rittera simplex* Vahl *Symb. ii.* 60 (1791). *R. grandiflora* Vahl *Ectog. Amer. ii.* 37 & *Ic. t. 9* (1798). *Tounatea simplex* Taubert in *Bot. Centralbl. xlvi.* 391 (1891). (Fig. 30.)

Wilson; March; Bath Garden, J. P. 1011, Morris! Castleton Garden, Harris! Fl. Jam. 8449, 9279.—Dominica, Martinique, St. Vincent, Bequia, Trinidad, Mexico, Guatemala, Costa Rica.

A small tree, 18-20 ft., glabrous. Leaflets lanceolate to elliptical, usually acuminate, 8-14 cm. l.; petiolules 2-5 mm. l.; stipules linear,

about 5 mm. l., soon falling. *Racemes* axillary, short, laxly 2-4-flowered. *Calyx* rupturing into 2-4 irregular segments. *Standard* roundish-kidney-shaped, about 4 cm. in diam. *Stamens*, 8-12 longer than the rest, with thicker filaments and oblong anthers on the side distant from the standard; the shorter stamens numerous, with thinner filaments, and smallish anthers. *Ovary* stalked. *Pod* 1-seeded, ellipsoidal, or 2-seeded,

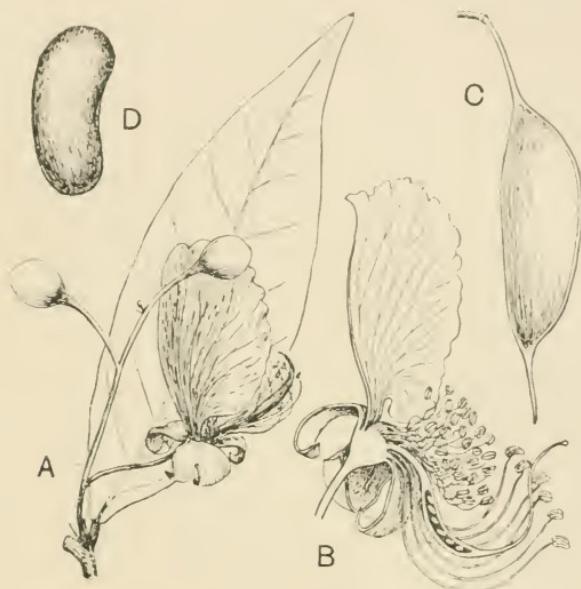


Fig. 20.—*Swartzia simplex* Spreng.

A, Leaf and inflorescence $\times \frac{2}{3}$.
 B, Flower cut lengthwise, nat. size.
 C, Pod $\times \frac{2}{3}$.
 D, Seed, nat. size.
 (B after Baillon.)

oblong, 2·5-5 cm. l., sometimes 3-seeded, constricted between the seeds, 5-10 cm. l., beaked with the persistent style. *Seeds* about 2 cm. l., kidney-shaped, arillate.

Urban divides the species into three varieties: var. α . *genuina*, leaflets with apex scarcely or shortly acuminate, and roundish or subcordate base, from the W. Indian Is. cited, omitting Jamaica; var. β . *jamaicensis*, leaflets long acuminate, and acute base, from Jamaica; and var. γ . *continentalis*, petioles longer and narrowly winged, from Central America.

SUBFAMILY 2. *CÆSALPINIÆ*.

Flowers irregular or sometimes regular; parts of the flowers generally in 5's. Sepals 5, or the 2 highest united making 4, imbricate. Petals imbricate, the upper within the rest. Stamens 10; anthers versatile. Radicle straight, enclosed within the edge of the cotyledons or shortly exserted. Leaves pinnate or bipinnate; stipels none or very rarely minute.

§ 13. Leaves abruptly bipinnate, or most leaves simply pinnate in *Hæmatoxylum*, apparently pinnate in *Parkinsonia*, with an odd pinna in *Cæsalpinia coriaria*. Calyx 5-cleft. Anthers versatile. Ovary or stalk of ovary free at the base of the calyx-tube; ovules 2 to numerous.

31. PELTOPHORUM Benth.

Trees. Leaves abruptly bipinnate, with 4 pairs of pinnae in *P. Linnaei*; leaflets numerous. Racemes simple or paniculate, terminal. Calyx 5-cleft; segments unequal. Stamens hairy at the base, 10, free, included. Stigma broad, terminal. Ovules 2 to numerous. Pod broadly oblong, flat, not opening, reticulate-veiny in the middle, slightly inflated, thinning to the margin, as it were 2-winged. Seeds few or 1, without endosperm.

Species 10, 4 in tropical America, 2 in Africa, and 4 in the East Indian archipelago and tropical Australia.

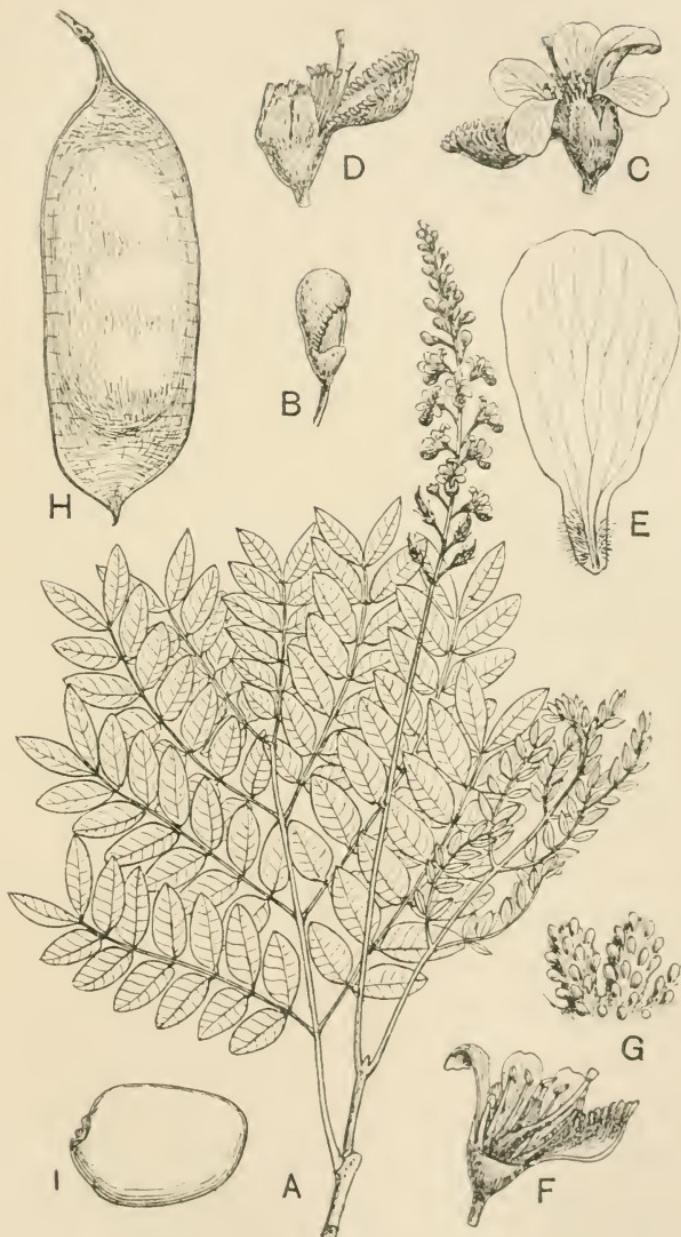
P. brasiliense Urb. *Symb. Ant.* ii. 285 (1900). *P. Linnaei* Benth. in *Hook. Journ. Bot.* ii. 75 (1840); *Griseb. Fl. Br. W. Ind.* 206. *Pseudo-santalum croceum* *Sloane Cat.* 213 & *Hist.* ii. 184, t. 231, f. 3, 4. *Cæsalpinia arborea* &c. *Browne Hist. Jam.* 227. *Robinia violacea* Mill. *Gard. Dict.* ed. 8 (1768) (the colour of the flowers is incorrect). *Cæsalpinia brasiliensis* L. *Sp. Pl.* 380 (1753) (in part), ed. 2, 544 (in part) & *Amen. v.* 378 non *Syst. ed.* 10, 1018 (Plumier's plant); *Sw. Obs. Bot.* 166; *Macf. Jam.* i. 328. *C. vesicaria* *Wright Mem.* 269 (non L.). *C. cubensis* *Greenm. in Trans. Acad. St. Louis vii.* 416, t. 32 (1897). (Fig. 31.) A specimen from Browne is in Herb. Linn. named by Linnaeus *C. brasiliensis*.

Braziletto.

In fl. in the spring; in fr. in the autumn; *Sloane*; *Houstoun!* every part where the soil is dry and rocky, *Browne!* *Wright!* *Dancer!* common in dry limestone districts, *Macfadyen!* *Wilson!* Long Mountain Road, 450 ft., *Campbell!* Sheldon Road; Papine Estate, 800 ft.; *Harris!* *Fl. Jam.* 5438, 5439, 6481, 8378.—Central America.

A tree 15–40(–80) ft. high, 8–12 in. (–4 ft.) in diam., without prickles. Leaflets 6–8 pairs, subopposite, elliptical, shining and minutely puberulous on the upper surface, puberulous on the midrib on both sides, puberulous or glabrate beneath, margin ciliolate, 2–4(–5) cm. l. Racemes axillary or terminal, solitary or clustered, with yellow flowers. Calyx glandular-dotted, 4 segments subequal, irregularly glandular-ciliate, 3–4·5 mm. l., the 5th segment larger, 6–7 mm. l., the margin glandular, comb-like. Petals 6–7 cm. l., 4 subequal, clawed, the 5th not clawed. Pod 6–10 cm. l., about 3 cm. br., glabrous, brown, 4–2-seeded.

An excellent timber wood, elastic, tough, durable, and takes a fine polish. It is used for ornamental purposes in cabinet-making, and is well adapted for making the spokes of wheels of carriages. It is of a beautiful orange colour, full of resin, and yields a fine full tincture by infusion. It was largely exported in Sloane's time for the use of dyers.

Fig. 31.—*Peltophorum brasiliense* Urb.

- A, Two leaves and inflorescence $\times \frac{1}{2}$.
- B, Flower-bud $\times 2$.
- C, Flower $\times 2$.
- D, Ditto with petals removed.
- E, Petal $\times 5$.

- F, Flower cut so as to show the pistil $\times 2$.
- G, Small portion of margin of largest sepal, showing glands, much enlarged.
- H, Pod $\times \frac{1}{2}$.
- I, Seed $\times 2$.

32. CÆSALPINIA L.

Shrubs or small trees. Leaves abruptly bipinnate (or with an odd pinna in *C. coriaria*). Racemes axillary or paniculate at the ends of branches. Calyx 5-cleft; segments imbricate, nearly equal. Stamens generally villose or glandular at the base. Ovules few. Pod 2-valved or not splitting open, of various forms, with blunt margins, not winged. Seeds without endosperm.

Species about 130, widely dispersed through the tropics.

Pods prickly.

- | | |
|--------------------|--------------------------|
| Seeds yellow | 1. <i>C. Bonduc.</i> |
| Seeds grey | 2. <i>C. bonducella.</i> |

Pods smooth.

Leaves abruptly pinnate.

Pinnæ in 5-10 pairs; leaflets in 8-12 pairs.

[Climber, very prickly *C. sepiaria.*] [

Erect shrub, scarcely prickly 3. *C. pulcherrima.*

Pinnæ in 2-3 pairs; leaflets in 2 pairs;

small tree 4. *C. vesicaria.*

Leaves with an odd pinna; small tree 5. *C. coriaria.*

§ 1. Pods covered with long straight prickles.

1. *C. Bonduc Roxb. Hort. Beng.* 32 (1814); stipules wanting; bracts erect at first in bud, later spreading, soon falling; seeds yellow.—*Bak. in Hook. f. Fl. Brit. Ind.* ii. 255; *Benth. in Fl. Bras. xv. pt. 2*, 66; *Urb. Symb. Ant.* ii. 272 & iv. 278. *Lobus echinatus fructu flavo &c. Sloane Cat.* 144 & *Hist.* ii. 40. *Frutex globulorum Rumph. Amboin.* v. 89, t. 48. *Guilandina Bonduc L. Sp. Pl.* 381 (1753) (in part) & *ed.* 2, 545 (1762) (excl. syn. *Pluk.*) ; *Griseb. Fl. Br. W. Ind.* 204 (excl. syn.). *G. glabra Griseb. op. cit.* 205 (1860) (excl. locality Martinique) (non *Mill.*).

Nickar Tree, Yellow Nickar, Bonduc.

"Among shrubs in the savannas everywhere," *Sloane Herb.* vi. 19! *Barham & R. Millar* in *Herb. Sloane!* in woods, *Broughton!* *Wright!* Great Valley, Manchester, *Purdie!* *Prior!* *Wullschaegel!* *March!* Tweedside; Mona Estate; near Troy, 2,000 ft.; Luana Point, Peckham Woods, Clarendon; Green Valley, St. Andrew; *Harris!* *Fl. Jam.* 6010, 9443, 9823, 11,087, 12,391.—Bahamas, Cuba, Grand Cayman, Hispaniola, Porto Rico, Mexico, Polynesia, Malay Islands, East Indies.

Shrub, branches trailing among other shrubs and climbing by help of prickles, minutely puberulous-tomentose, much less prickly than *C. bonducella* Fleming. *Leaves* very large, 3-6 dm. l.; rhachis with a few recurved prickles; pinnæ in 2-8 pairs, 7-20 cm. l.; leaflets in 4-7 pairs, often with 2 hooked prickles at the base of each pair, ovate to elliptical, generally very shortly acuminate, mucronate, base rounded, glabrous, generally slightly leathery, 6-4 (7-2) cm. l. *Racemes* usually paniculate, dense at apex in bud, somewhat lax lower, with numerous yellow flowers, 1.5-3 dm. l., without prickles or sometimes with a few; bracts lanceolate-acuminate, 4-6 mm. l. *Calyx* 8-9 mm. l., tomentose. *Petals* a little

longer than the calyx, 10-11 mm. l. Stamens a little shorter than the calyx. Pod 6·5-9 cm. l., 5·5 cm. br. Seeds 2 or 1 in the pod, subglobose, without endosperm.

2. *C. bonducella* Fleming in *As. Res.* xi. 159 (1810), reprinted as *Catal. Ind. Medic. Pl. & Drugs* 11 (1810); stipules of 2 or 3 leaf-like segments; bracts projecting far beyond the buds, recurved

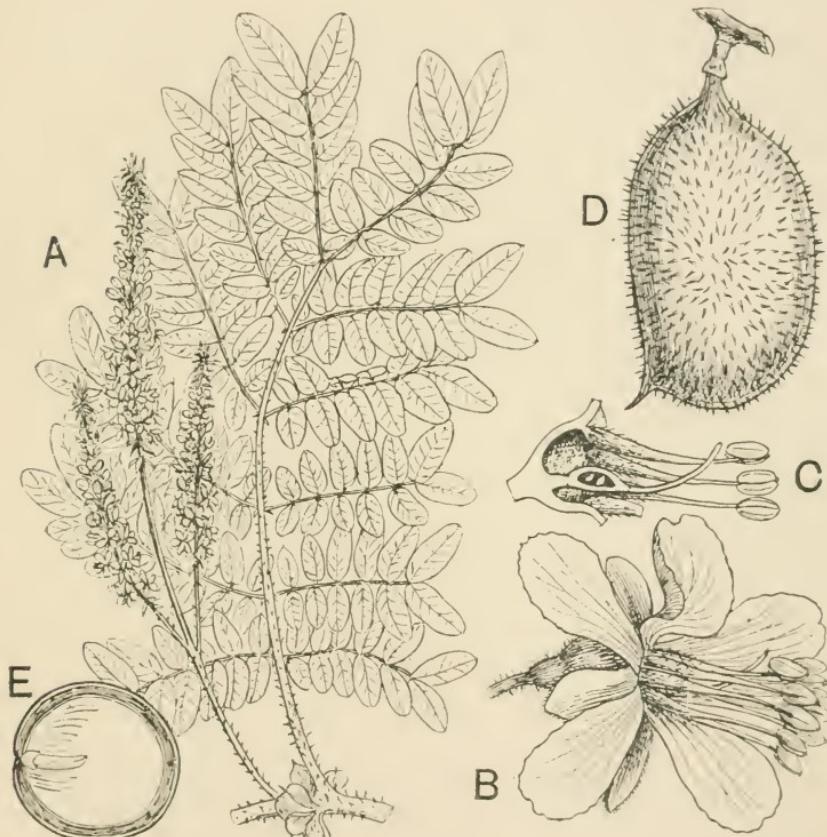


Fig. 32.—*Cæsalpinia bonducella* Fleming.

A, Leaf with inflorescence, much reduced. D, Pod $\times \frac{1}{2}$.
B, Flower $\times 2$. E, Seed cut to show cotyledon and plumule $\times \frac{1}{2}$.
C, Flower cut lengthwise, with sepals and petals removed $\times 2$. (After *Flora Brasiliensis*.)

or spreading; seeds pale greenish-grey.—*Bak. tom. cit.* 254; *Benth. tom. cit.* 65, t. 21; *Bentl. & Trim. Med. Pl. t. 85*; *Watt Econ. Prod. ii. 3*. *C. Crista L. Sp. Pl.* 380 (1753) (in part): *Urb. Symb. Ant. ii. 269* (1900) & *iv. 278*. *Caretti Rheed. Mal. ii. 35, t. 22*. *Acacia gloriae &c. Pluk. Phyt. t. 2, f. 2 & in Herb. Sloane xv. 6*. *Lobus echinatus fructu cæsio &c. Sloane Cat.* 144

& *Hist.* ii. 41. *Christa pavonis...* semine cinereo *Breyn. Prodr.* iii. app. 33, t. 28. *Globuli majores Rumph. Amboin.* v. 92, t. 49, f. 1. *Guilandina aculeata* &c. *L. Fl. Zeyl.* n. 156 & in *Herb. Hermann* ii. 17 & iii. 35. *G. spinosa* &c. *Browne Hist. Jam.* 228. *G. Bonduc L. Sp. Pl.* 381 (1753) (in part); *Macf. Jam.* i. 326 (in part) (non *L. ed.* 2). *G. Bonducella L. Sp. Pl. ed.* 2, 545 (1762) & *Mant.* 378; *Griseb. Fl. Br. W. Ind.* 204. (Fig. 32.)

Grey Nickar, Bonduc.

Grows with the former species, *Sloane Herb.* vi. 19! *Browne!* *Wright!* *Lane!* *Priestmans River, Deans!* *Lucea;* *Blue Mts.; Hitchcock;* *Luana Point, Harris!* *Fl. Jam.* 9824.—Tropical and subtropical regions.

Shrub climbing by help of prickles; stem diffuse, puberulous-downy, more or less beset with straight unequal prickles. *Leaves* very large, 3–6 dm. l.; rhachis with recurved prickles; pinnæ in 6–8 (5–9) pairs, 10–15 cm. l.; leaflets in 7 (5) pairs, with 2 hooked prickles at the base of each pair, oblong-ovate, elliptical, or oblong-elliptical, sometimes very shortly or obtusely acuminate, mucronate, base rounded, puberulous on midrib on both sides and on margin, and sometimes all over beneath, membranous or papery, 2–4 (5) cm. l. *Racemes* long-stalked, dense at apex in bud, somewhat lax lower, with numerous yellow flowers, 1–1·5(–3) dm. l.; rhachis sometimes prickly; bracts linear-lanceolate, acuminate, 6–12 mm. l. *Calyx* about 8 mm. l., tomentose. *Petals* oblong, the upper one broader above and shorter, half as long again as the sepals. *Stamens* shorter than the petals. *Ovary* often abortive, so that many flowers are male. *Pod* bright orange-brown, 5–7 cm. l., 3–5 cm. br. *Seeds* 2 or 1 in the pod, subglobose, without endosperm.

"Bonduc seeds are regarded in India as tonic and antiperiodic. . . . They have been employed with success in intermittent fevers, especially in those of the natives of India; and also generally in debility and other cases where tonics are necessary. The powdered kernels are either given alone, or combined with chiretta and other Indian tonics, or mixed with powdered black pepper. . . . Dr. Kirkpatrick and other practitioners regard Bonduc root, especially its bark, as more valuable than the seed, in the treatment of intermittents, and for use generally as a tonic. Besides the use of Bonduc seeds in medicine, they are commonly, from their hard and polished nature, strung into necklaces, rosaries, bracelets, &c."—*Bentley & Trimen, "Medicinal Plants."*

"These nuts are often cast ashore by the sea on the north-west coasts of Ireland and Scotland, and are called Molucca Beans by the inhabitants of the latter."—*Sloane* (specimens of these are in his fruit collection).

A specimen in *Herb. Linn.* of a leaf of this species from Browne, named "*Zantoxylon clava Herculis*" in Solander's hand, is correctly named on the sheet by J. E. Smith.

§ Pods without prickles.

[*C. sepiaria Roxb. Hort. Beng.* 32 (1814); prickly scrambling climber; pinnæ in 6–10 pairs; leaflets in 8–12 pairs.—*Griseb. op. cit.* 205; *Bak. tom. cit.* 256; *Urb. Symb. Ant.* ii. 277 & iv. 279.

Wait-a-bit.

Cinchona, Clute! *Eggers;* near Gordon Town, *Ball!* *Poros,* *Lloyd;* *Blue Mts., Port Antonio, Hitchcock.*—Naturalized also in Cuba, Hispaniola, Porto Rico, Guadeloupe, Dominica, Martinique, St. Vincent, Barbados, Grenada, Brazil, Africa. Native of India and eastern Asia.

Shrub, climbing high amongst shrubs and trees by means of its prickles

and long trailing branches; branches clothed with grey or brown tomentum, prickly. *Leaves* 2-3 dm. l.; leaflets small, oblong, apex rounded, membranous, puberulous, glaucous beneath, 1-2·5 cm.l.; rhachis with recurved prickles. *Racemes* simple, stalked, with numerous pale yellow flowers, 1·5-3 dm. l.; pedicels erect-spreading, about 2 or 3 times as long as the calyx; bracts ovate, acuminate, spreading, soon falling, 8-10 mm.l. *Calyx* 9-12 mm. l., broad saucer-shaped base persisting in the fruit. *Petals* 12 mm. l. *Stamens* slightly longer than the petals; filaments densely woolly below. *Pod* boat-shaped, with a long beak, persistent and opening wide, 6-8-seeded, 7-10 cm. l., 3 cm. br.

Makes an impenetrable fence.]

3. *C. pulcherrima* Sw. *Obs. Bot.* 166 (1791); erect shrub, scarcely prickly; pinnae in 5-10 pairs; leaflets in 8-12 pairs.—*Griseb. op. cit.* 205; *Benth. tom. cit.* 67; *Bak. tom. cit.* 255; *Urb. Symb. Ant.* ii. 282 & iv. 279. *Frutex pavoninus* &c. *Breyn. Cent.* 61, t. 22. *Sena spuria*... flore ex luteo et rubro specioso *Sloane Cat.* 149 & *Hist. ii.* 49. *Poinciana aculeata* foliis bipinnatis *Browne Hist. Jam.* 225. *P. pulcherrima* L. *Sp. Pl.* 380 (1753); *Jacq. Sel. Stirp. Amer.* 122 & *Ed. pict. t.* 120; *Bot. Mag. t.* 995; *Macf. Jam. i.* 331. Type in Herb. Linn.

Barbados Pride, Flower Fence, Wild Senna, Spanish Carnations.

"Moist grounds and gullies by the Rio Cobra banks near the town of St. Jago de la Vega, &c." *Sloane Herb.* vi. 25, 26, 27! *Houstoun!* *Broughton!* *Macfadyen*; *Lucea*, *Hitchcock*; *Poros*, *Lloyd*; *Hope Grounds*, *Harris!* Fl. Jam. 8281, 8282.—Bahamas, West Indies, and tropical continental America, universally cultivated in the tropics.

Shrub or small *tree*, to 10 or 12 ft. high, glabrous, with only a few scattered prickles on the branches. *Leaves* 1-3 dm. l. and more; leaflets oblique-oblong, apex rounded, close together, 1-2 cm. l. *Racemes* showy, terminal, pyramidal, lax, lower pedicels 5-10 cm. l., sometimes also 1 or 2 lateral racemes, with numerous very handsome red-orange or yellow flowers. *Calyx*, sepals unequal, 10-16 mm. l. *Petals* roundish, margin crisped, passing into a claw, 2-2·5 cm. l. *Filaments* red, about 3 times as long as the petals. *Pod* nearly straight, flat, linear-oblong, somewhat broader at the apex, mucronate, thin, 6-8-seeded, 8-11 cm. l., 1·5-2 cm. br.

4. *C. vesicaria* L. *Sp. Pl.* 381 (1753); small tree, often prickly; pinnae in 2-3 pairs; leaflets in 2 pairs.—*L. Syst. ed.* 10, 1018 & *Sp. Pl. ed.* 2, 545; *Urb. Symb. Ant.* ii. 283. *C. bijuga* Sw. *Obs. Bot.* 166 (1791); *Macf. Jam. i.* 329; *Griseb. op. cit.* 205 (excl. syn. *C. glandulosa* Bert. and locality Haiti). *Sena spuria* arborea spinosa... flore luteo &c. *Sloane Cat.* 149 & *Hist. ii.* 50, t. 181, f. 2, 3. *Caesalpinia spinosa* foliis minoribus &c. *Browne Hist. Jam.* 227. *Poinciana bijugata* *Jacq. Enum. Pl. Carib.* 20 (1760) & *Sel. Stirp. Amer.* 123. *Acacia Bancroftiana* *Bert. ex DC. Prodr.* ii. 473 (1825). Sloane's specimen is in Herb. Mus. Brit. A specimen from Browne named in Solander's hand is in Herb. Linn.

Indian Savin Tree, Bastard Nicarago, Jack Fish Wood.

Passage Fort, and along the road thence to St. Jago de la Vega, *Sloane Herb.* vi. 40! *Browne!* *Wright!* *Shakspear!* *Bancroft!* *Macfadyen!* *Wilson!*

Prior; *Vere*, *Husband*! *Ferry*, *Campbell*! Great Goat Island; Bull Bay; *Harris*! Fl. Jam. 6226, 9210, 11,858.—Cuba, Curaçao, Yucatan.

Small tree, 15–20 ft. high, all parts when bruised have a balsamic scent. Leaves 5–10 cm. l.; leaflets obliquely elliptic-obovate or obocordate, unequal-sided at the base, 1·5–3·5 cm. l. Panicle terminal, with numerous yellow flowers. Bracts minute, very soon falling. Calyx: tube 2 mm. l., sepals 4, yellow, 6–7 mm. l., the fifth greenish, 8 mm. l. Petals a little longer than the sepals, unequal, 4-clawed. Stamens a little shorter than the petals. Pod somewhat swollen, succulent, blackish-brown, 3(1–5)-seeded, with partial divisions between the seeds, 3·5–5 cm. l. Seeds more or less roundish-flattened, 7–8 mm. in diam.

5. *C. coriaria* Willd. Sp. Pl. ii. 532 (1799); small tree without prickles; pinnæ in 4–7 pairs and an odd one; leaflets in 18–28 pairs.—*Macf. Jam.* i. 330; *Watt Dict. Econ. Prod. Ind.* ii. 6; *Urb. Symb. Ant.* ii. 284. *Poinciana coriaria* Jacq. *Sel. Stirp. Amer.* 123, t. 175, f. 36 & *Ed. pict.* t. 260, f. 33. *Libidibia coriaria* Schlecht. in *Linnæa* v. 193 (1830); *Griseb. op. cit.* 206.

Divi-divi, Libi-dibi.

In fl. May and Sept.-Nov. after rains; Liguanea plain, *Macfadyen*! *McNab*! *Harris*!—Bahamas, Cuba, Hispaniola, St. Thomas, St. Cruz, Martinique, Trinidad, Curaçao, Mexico, Venezuela, Colombia; introduced into India.

Small crooked tree, 15–30 ft. high. Leaves 6–8 cm. l.; leaflets linear-oblong, 5–9 mm. l., 1–2 mm. br. Panicles terminal and axillary, much shorter than the leaves, with numerous crowded fragrant white flowers. Calyx: tube 2·5 mm. l., sepals 3–4 mm. l., recurved. Petals about 4 mm. l., one recurved, lip-like. Stamens longer than the petals, 6–7 mm. l. Pod curled, flat, not splitting open, 6–8-seeded, 3·5–5 cm. l., 2 cm. br.

The pods are rich in tannin, and are used by tanners for the same purposes as sumach. Fermentation occurs in cargoes, due to the presence of the oily seeds, and it has been suggested that an extract might be made locally from fresh pods. Trees in dry districts yield good results; cultivation is not necessary. The pod powdered is astringent, anti-periodic, and tonic.

C. sappan L. (Sp. Pl. 381), a native of India and the Malay Islands, is cultivated and is perhaps now spontaneous in Jamaica. It is a small tree; leaves 1·5–3 dm. l., pinnae in 9–12 pairs, leaflets in 10–15 pairs, oblong, very oblique at base, 15–20 mm. l., 7–10 mm. br.; panicles often as long as the leaves; pod oblique, oblong, woody, not opening, 3–4-seeded. The pods are used in India for tanning and dyeing, and the wood for dyeing.

[*HÆMATOXYLOM* L.]

Tree, the wood of which contains a valuable dye. Leaves abruptly pinnate, or bipinnate, the lowest pair of leaflets becoming pinnæ; leaflets in few pairs (2–4). Racemes axillary. Calyx 5-cleft; segments somewhat unequal, very imbricate. Petals small, yellow, narrowly obovate. Stamens hairy at the base. Ovules 2 or 3. Pod flat-compressed, splitting open in the middle of the valves, not at the margins. Seed transversely oblong, without endosperm; hilum ventral.

Species 1, native of central America and Colombia.

H. campechianum L. Sp. Pl. 384 (1753); Sw. Obs. Bot. 170; Wright Mem. 216; Tussac Fl. iv. t. 36; Descourt. Fl. Ant. ii. t. 73; Macf. Jam. i. 332; Griseb. Fl. Br. W. Ind. 204; Bentl. & Trim. Med. Pl. t. 86; Urb. Symb. Ant. iv. 277. *H. spinosum* &c. Browne Hist. Jam. 221. *Lignum campechianum* &c. Sloane Cat. 213 & Hist. ii. 183, t. 231, f. 1, 2. Type in Herb. Linn.

Logwood.

Naturalized and spontaneous; Wright! Broughton! Macfadyen; Distin! McNab! Parnell! Wilson! J.P. 1356, Morris! Clute! Morant Bay, Fawcett! Harris! Constant Spring; Port Morant; Lucea; Hitchcock; Porus, Lloyd. Fl. Jam. 8251, 8252.—Bahamas, West Indies, Central America and northern S. America.

A low tree. Leaves alternate or 2-4 together on an aborted branch; leaflets obovate or obcordate, 1-2·5 cm. l. Racemes usually about as long as the leaf or a little longer, with numerous fragrant flowers, elongating as the pods form. Sepals unequal, purplish, 4·5 mm. l. Petals subequal, 6-7 mm. l. Pod oblong, narrowing to both ends, 2-3-seeded, 3-5 cm. l.

After a hurricane which strips off the leaves, the tree soon bursts into leaf again, and many of the leaves have leaflets enormously increased in size, becoming about 7 cm. l. and nearly as broad.

The heart-wood is of a dark red or deep purple bronze-tinted colour, and this alone is exported, together with the roots, as a dye-wood, the whitish sapwood being chipped off. Sloane says that "it is cut about the town of Campeche in great quantities, and brought to Jamaica in sloops to be sent into Europe by the traders in Jamaica." Wright states that Dr. Barham introduced the seeds into Jamaica from Honduras about the year 1715. Logwood is a mild astringent. It has been found useful in chronic diarrhoea and dysentery, in some forms of atonic dyspepsia, and especially in the diarrhoea of infants (Bentley and Trimen). The tree makes a strong fence against cattle.

"Bastard" Logwood has a much lighter coloured heart-wood, yielding little or no dye. There are no characters of leaf or flower which distinguish it from the true Logwood. It may be considered a physiological species, and trees should be destroyed wherever found. (See Bull. Torr. Bot. Cl. xxxi. 367.)

[POINCIANA L.

Trees. Leaves abruptly bipinnate; leaflets numerous, small. Flowers handsome, orange or scarlet, corymbose-racemose at the apex of branches. Calyx with 5 nearly equal valvate segments. Petals large, roundish. Stamens hairy at base. Ovules numerous. Pod flat-compressed, hard, with oblique veins, 2-valved, with soft woody tissue between the seeds. Seeds transverse, oblong, with endosperm.

Species 3, natives of tropical eastern Africa, Madagascar, and the western provinces of India.

P. regia Boj. ms. ex Hook. Bot. Mag. t. 2884 (1829); Cook & Coll. in Contrib. U.S. Nat. Herb. viii. 223, t. 54; Urb. Symb. Ant. iv. 278; Drake del Castillo in Grandid. Hist. Madagascar xxx. (Plantes) i. 78.

Poinciana, Flamboyant, Flame Tree.

Cultivated and spontaneous; yellow-flowered form, Bull Bay, *Harris!* cultivated in tropics, native of Madagascar.

Tree 30-40 ft. high. *Leaves* 2-3 (6) dm. l.; pinnæ in 15 (11-18) pairs, 5-10 cm. l.; leaflets in 12-25 pairs, linear-oblong, 5-8 mm. l., glaucous beneath. *Racemes* shorter than the leaves, with bright scarlet flowers, very rarely yellow or orange. *Sepals* 2-3.5 cm. l., 5-8 mm. br. *Petals* somewhat roundish with long claws, unequal, 4-6 cm. l., 3-4.5 cm. br. *Stamens* shorter than the petals. *Pod* 20-50 cm. l., 5-6 cm. br.]

[**PARKINSONIA** L.

Trees. Leaves apparently simply pinnate and clustered, but in fact bipinnate, with a very short petiole; rhachis prolonged above the insertion of the pinnae into a persistent rigid sharp pointed spine; pinnae 2 or 4, very long, flattened and with wing-like margins, often falling and leaving scars at the base of the spine; leaflets numerous, minute, often falling or abortive; stipules in the form of short curved prickles, often falling and leaving scars at the base of the spine; the axillary branch is sometimes abortive, except that the leaves are developed forming an addition to the primary one. Flowers racemose, yellow. Calyx 5-cleft, segments nearly equal, narrowly imbricate or subvalvate. Petals spreading somewhat unequal, the uppermost broader. Stamens hairy at base. Ovules numerous. Pod narrow, acuminate at both ends, constricted between the seeds, 2-valved. Seeds oblong; embryo with horny endosperm along the sides.

Species 3 or 4, one a native of southern Africa, the rest of tropical and subtropical parts of America, one (*P. aculeata* L.) being now found generally in the tropics.

P. aculeata L. *Sp. Pl.* 375 (1753); *Jacq. Sel. Stirp. Amer.* 121, *t.* 80 & *Ed. pict.* *t.* 119; *Wright Mem.* 267; *Descourt. Fl. Ant. i. t.* 12; *Macf. Jam. i.* 334; *Griseb. Fl. Br. W. Ind.* 204; *Sarg. Silv. iii.* 89, *t.* 131. *P. aculeata* &c. *Plum. Nov. Pl. Amer. Gen.* 25, *t.* 3; *L. Hort. Cliff.* 157, *t.* 13; *Browne Hist. Jam.* 222. Specimen in Herb. Linn. named in Solander's hand.

Jerusalem Thorn.

Browne! *Wright!* cultivated, round Kingston, *Broughton!* *Shakespear* Port Royal, *McNab!* Kingston, *Campbell!* *Hitchcock.*—Cultivated and often naturalized in tropical and subtropical regions. Browne states that it was introduced into Jamaica from the mainland, where it is most likely native.

A shrub or small tree 12-30 ft. high. *Spines* about 3 cm. l. *Pinnae* 1.5-3 dm. l.; leaflets linear or oblanceolate, obtuse, 2-6 mm. l. *Racemes* lax, slender, shorter than the leaves, 12-15 cm. l. *Petals* about 1.2 cm. l., bright yellow, the upper one with red spots below, imbricate. *Stamens* much shorter than the petals. *Pod* 6-12 cm. l., dark orange-brown. *Seeds* 1-8, distant from one another, about 1 cm. l.]

§ 14. Leaves abruptly pinnate. Calyx 5-cleft, segments imbricate. Petals 5. Anthers basifixd, opening by pores or chinks. Ovary or stalk of the ovary free at the base of the calyx; ovules indefinite. Seeds with endosperm.

33. CASSIA L.

Trees, shrubs or herbs. Leaves abruptly pinnate; leaflets opposite. Flowers in racemes, panicles, clusters, or solitary. Calyx 5-cleft, segments imbricate, deciduous. Petals 5, imbricate, subequal or the lower larger, the highest inside the rest. Stamens sometimes 10, all perfect and subequal, or the upper smaller, or the 3 highest very small and imperfect or wanting; anthers basifixd, all similar or those of the lower stamens larger, discharging the pollen by pores or short chinks at the apex, or by pores at the base. Pod cylindrical or flat-compressed, dry or filled with pulp, often with many cells separated by transverse walls.

Species 380, widely dispersed through the tropics, numerous in America from southern Chili to Massachusetts, very many in the whole of Africa, occurring also in tropical Asia and in Australia, but none in Tasmania and New Zealand.

I. Perfect stamens usually 7; the 3 lowest with long curved filaments longer than the petals, and anthers ovate or ellipsoidal not more than 4-6 mm. l., opening by longitudinal chinks; filaments of the 4 or 5 intermediate stamens much shorter, anthers opening by pores at the base; the uppermost 3 or 2 much smaller and usually imperfect. Pod long, smooth and cylindrical, or rough and slightly compressed, hard, not splitting open. Seeds flattened parallel to the tranverse partitions. Glands on leaves wanting.

Leaflets oblong, in 8-20 pairs.

- Leaflets rounded at both ends. Pod rough compressed 1. *C. grandis.*
- [Leaflets emarginate, unequal-sided. Pod smooth, cylindrical..... *C. marginata.*]
- [Leaflets ovate, in 4-8 pairs. Pod smooth, cylindrical... *C. fistula.*]

II. Perfect stamens usually 7 (10 in *C. glauca*), the 2 or 3 lowest somewhat longer than the rest; anthers with 1 or 2 pores at the apex, linear, curved, 6-13 mm. l.; staminodes usually 3. Pod cylindrical or compressed, opening at one or both margins, valves not elastic, or more rarely not opening at all.

Leaves glandular at the base of the petiole.

- Gland tuberculate..... 6. *C. occidentalis.*
- Gland cylindrical.
 - Leaflets glabrous 8. *C. ligustrina.*
 - Leaflets hairy on both sides 7. *C. hirsuta.*

Leaves glandular between the leaflets.

Leaflets broader near the apex.

Leaflets glabrous on the upper side.

Leaflets glabrous beneath, 3–5 pairs..... 3. *C. bicapsularis*.

Leaflets puberulous near base beneath,

7–10 (4–) pairs 12. *C. biflora*.

Leaflets puberulous beneath, 3(–2) pairs 9. *C. tora*.

Leaflets puberulous on both sides, 4 (3–5) pairs 10. *C. uniflora*.

Leaflets not broader near the apex.

Leaflets, 2 pairs, acute 2. *C. viminea*.

Leaflets, 3–4 pairs, acuminate, 7–3 cm. l. 4. *C. laxigata*.

Leaflets, 3–5 pairs, oblong, 4–1 cm. l. 11. *C. bahamensis*.

[Leaflets, 6–4 pairs, elliptical, 7–3 cm. l. *C. glauca*.]

Leaflets, 10–15 pairs, elliptical, 2–1 cm. l. 13. *C. clarendonensis*.

Leaves without glands.

[Leaflets obovate *C. obovata*.]

Leaflets not obovate.

Leaflets large (over 8 cm. l.), oblong. Pod

winged 15. *C. alata*.

Leaflets not large (under 8 cm. l.). Pod not

winged.

Leaflets ovate-elliptical. Pod cylindrical 5. *C. spectabilis*.

Leaflets elliptical, tomentose-soft beneath ... 14. *C. emarginata*.

[Leaflets lanceolate-oblong, glabrate beneath *C. siamea*.]

III. Stamens 10, or fewer, all perfect (rarely 2–4 abortive in *C. lineata*), similar, subequal; anthers linear, opening by short chinks at the apex. Pod flat, linear, elastically 2-valved.

Flowers in racemes. Plant viscid. Leaflets 2 pairs 16. *C. Absus*.

Flowers solitary or in clusters.

Leaflets less than 10 pairs.

Leaflets membranous.

Leaflets, 1 pair, without glands 17. *C. rotundifolia*.

Leaflets, 2–5 pairs, without glands 18. *C. pilosa*.

Leaflets, 5–7 pairs; gland small, long-stalked... 19. *C. serpens*.

Leaflets more or less leathery.

Leaflets, 2–5 pairs, tomentose beneath; gland 1,
sessile 20. *C. lineata*.

Leaflets, 4–8 pairs, glabrous; glands 1 or few,
sessile or stalked 21. *C. polyadena*.

Leaflets more than 10 pairs.

Gland long-stalked, 1 or more. Calyx not less
than 7 mm. l.

Corolla longer than calyx. Pod pubescent or
glabrate, 3–4 cm. l. 22. *C. glandulosa*.

Corolla shorter than calyx. Pod villose, 4·5–5
cm. l. 23. *C. Broughtonii*.

Gland stalked, 1. Calyx 4–5 mm. l.

Gland somewhat flat. One petal longer than
calyx 24. *C. nictitans*.

Gland sessile, 1 or rarely 2.

Gland flat, round. Calyx 5–6 mm. l. Petals
not longer than calyx 25. *C. patellaria*.

Gland cup-shaped. Calyx 7–8·5 mm. l. Petals,
2 or 3 longer than calyx.

Leaves 7–9 cm. l. 26. *C. fasciata*.

Leaves 2–4 cm. l. 27. *C. smaragdina*.

I. Perfect stamens usually 7; the 3 lowest with long curved filaments, longer than the petals, and anthers ovate or ellipsoidal, not more than 4–6 mm. l., opening by longitudinal chinks; filaments of the 4 or 5 intermediate stamens much shorter, anthers opening by pores at the base; the uppermost 3 or 2 much smaller and usually imperfect. Pod long, smooth and cylindrical, or rough and slightly compressed, hard, not splitting open. Seeds flattened parallel to the transverse partitions. Glands on leaves wanting.

1. *C. grandis* Linn. *f. Suppl.* 230 (1781); leaflets, 8–20 pairs, oblong, rounded at both ends, with sparse minute hairs on the upper surface, pubescent-tomentose beneath, 2·5–6 cm. l.; anthers pubescent; pod compressed-cylindrical, rough with transverse markings, one margin with a prominent obtuse rib, the other with 2 prominent ribs.—*Griseb. Fl. Br. W. Ind.* 207; *Benth. in Fl. Bras. xv. pt. 2*, 93 & *Trans. Linn. Soc. xxvii.* 515; *Urb. Symb. Ant.* iv. 272. *C. brasiliiana* Lam. *Encyc. i.* 649 (1783); *Macf. Jam. i.* 337. *C. fistula* flore incarnato brasiliiana *Breyne. Cent. Prim.* 58, t. 21 (t. 14 cited by Linn. f. should be excluded on account of the form of the leaves). *C. nigra* . . . *Brasiliana Sloane Cat.* 146 & *Hist. ii.* 44. *C. foliis &c. Browne Hist. Jam.* 223. *C. javanica* L. *Sp. Pl. ed. 2*, 542 (1762) (so far as regards syn. *Browne*, *Bauhin*, and *Sloane*); *Mill. Gard. Dict. ed. 8*; *Wright Mem.* 197.

Horse Cassia.

Barham in Hb. *Sloane*! "Common in lowland woods by the sides of rivulets," *Sloane Herb. vi.* 21! *Houston*! *Oersted*! *Jenman*! *Priestmans River, Wales*! *Fl. Jam.* 408.—*Cuba*, *Hispaniola*, *Porto Rico*, *St. Thomas*, *St. Cruz*, *Guadeloupe*, *St. Vincent*, *Central America*, *Colombia*, *Guiana*.

Tree, 40–50 ft. high; the twigs, petioles and inflorescence covered with rusty or white pubescence. *Leaves* 1·5–2·5 dm. l. *Racemes* lateral, simple, 1–2 dm. l. *Calyx* 6–9 mm. l. *Petals* roundish, 1–1·4 cm. l. *Ovary* tomentose-villose. *Pod* 2·5–6 dm. l., about 4 cm. br., inside with transverse partitions, the cells filled with pulp.

The pulp is used like that of *C. fistula*, but is coarser and more powerful. The wood is strong and handsome, and useful for many purposes.

[*C. marginata* Roxb. *Hort. Beng.* 31 (1814); *Fl. Ind. ii.* 338 (1832); leaflets 10–15 pairs, oblong, apex emarginate, mucronate, unequal at the base, glabrate on upper surface, tomentose beneath, 2–3·5 cm. l.; anthers glabrous; pod cylindrical, somewhat contracted between the seeds.—*Griseb. loc. cit.*; *Benth. in Trans. Linn. Soc. xxvii.* 517; *Wils. in Reports Geolog. Jam.* 277. *C. Roxburghii DC. Prodr. ii.* 489 (1825); *Wight Illustr. t.* 83.]

Naturalized, *Wilson*.—*India*, *Ceylon*.

A small ornamental *tree*; twigs, petioles, and inflorescence tomentose. *Leaves* 1·5–2·5 dm. l. *Racemes* axillary, somewhat corymbose, much shorter than the leaves, 5–8 cm. l. *Calyx* 5–6 mm. l. *Petals* pink or

salmon-coloured, about 1 cm. l. Pod 2-3 dm. l., about 2 cm. in diam., with numerous seeds.

"The heart-wood is heavy, very hard, reddish-brown, small" (Trimen).]

[*C. fistula L. Sp. Pl. 377* (1753); leaflets 4-8 pairs, very large, 6-14 cm. l., ovate to oblong-elliptical, blunt to sub acuminate, glabrous; anthers glabrous; pod cylindrical, smooth.—*Wright Mem. 197*; *Tussac Fl. Ant. iv. t. 2*; *Descourt. Fl. Ant. ii. t. 125*; *Macf. Jam. i. 337*; *Griseb. Fl. Br. W. Ind. 206*; *Benth. in Fl. Bras. xv. pt. 2, 92 & Trans. Linn. Soc. xxvii. 514*; *Bentl. & Trim. Med. Pl. t. 87*; *Urb. Symb. Ant. iv. 272*. *C. nigra . . . Alexandrina Sloane Cat. 145 & Hist. ii. 42*. *C. arborea* &c. *Browne Hist. Jam. 222*. Type in Herb. Hermann in Herb. Mus. Brit.; a specimen named by Linnaeus is in Herb. Linn.

Cassia-stick Tree.

In fl. June, in fr. Jan.; common in gardens and cultivated ground at low elevations; *Barham* in Herb. *Sloane!* *Sloane* Herb. vi. 20. *Browne*; *Wright!* *Broughton!* *Macfadyen!* *Distin!*—Tropics, cultivated, probably native in tropical Asia.

A handsome tree, glabrous, low-growing to 40 or 50 ft. high. Leaves 3 dm. l. or more. Racemes pendulous, lax, generally simple, sometimes branched at the base, as long as the leaves or longer; pedicels 3-6 cm. l. Calyx 6-10 mm. l., soon falling; apex of segments rounded or obtuse. Petals ovate-elliptical or obovate-elliptical, 2-2.5 cm. l., veined, bright yellow, slightly fragrant. Pod 8-6 dm. l., 1.5-2 cm. in. diam.; pulp shining brownish-black in colour and sweet to the taste.

The pulp, fresh from the pod, is agreeable, and is used as a mild laxative in small doses and as a purgative in larger doses. The bark is used in tanning. The heart-wood is extremely hard, and is used for posts, carts, and agricultural implements.]

II. Perfect stamens usually 7 (10 in *C. glauca*), the 2 or 3 lowest somewhat longer than the rest; anthers with a simple or double pore at the apex, linear, curved, 6-13 mm. l.; the 3 highest stamens usually imperfect. Pod cylindrical or compressed, opening at one or both margins, valves not elastic, or, more rarely, not opening at all.

2. *C. viminea L. Syst. ed. 10, 1016* (1759); leaflets, 2 pairs, 2-7 cm. l., obliquely ovate, ovate-lanceolate or ovate-oblong, acute or sub acuminate, very unequal at the base, the lower pair shorter than the upper, shining on the upper surface, minutely puberulous or glabrate beneath; gland linear-cylindrical, acute, between the lower pair, and also sometimes between the upper.—*L. Amaen. v. 397 & Sp. Pl. ed. 2, 537*; *Sw. Obs. Bot. 156*; *Macf. Jam. i. 341*; *Griseb. loc. cit.* *C. melanocarpa Bert. ex DC. Prodr. ii. 491* (1825); *Macf. Jam. i. 338*. *C. viminea* foliis &c. *Browne Hist. Jam. 223*. *Sena spuria tetraphylla* &c. *Sloane Cat. 149 & Hist. ii. 49, t. 180, f. 6, 7*. The type, Browne's specimen, is in Herb. Linn.

In fl. and fr. autumn and winter; Red Hills, *Sloane* Herb. vi. 31! *Wright*! *Cold Spring*, *Browne*! mountain thickets, *Swartz*! also *Macfadyen*; *Bancroft*! *March*! *Cinchona*, J. P. 1112, *Hart*! *Mandeville*, *Panton*! between *Abbey Green* and *Blue Mt. Peak*, *Hitchcock*.—Guiana, northern Brazil.

A trailing shrub rising to 7 or 8 ft. or more, supporting itself on rocks and trees. *Stipules* long, bristle-like, 5–1 cm. l. *Racemes* forming a terminal panicle, leafy at the base, corymbose. *Bracts* lanceolate, soon falling, about 6 mm. l. *Calyx* 4–6 mm. l. *Petals* yellow, showy, puberulous outside, 12–16 mm. l. *Pod* 3–7 (10) cm. l., cylindrical, black, smooth, apex rounded, apiculate with the persistent style, base rounded, with a short (5 mm.) stalk, “dehiscent along the suture” (Griseb.).

C. fruticosa Mill. (*C. bacillaris* Linn. f.) occurs in some of the W. Indian islands, and in tropical continental America, but we have only seen a garden specimen from Jamaica. It differs from *C. viminea*, especially in the leaflets being larger and semiovate; the flowers being larger, calyx 1 cm. l., petals 2 cm. l., and the pod larger, 2–3 dm. l.

3. *C. bicapsularis* L. Sp. Pl. 376 (1753); leaflets, 3–5 pairs, obovate-elliptical or elliptical-roundish, glabrous, 1·5–3 cm. l., the lower generally smaller than the upper; gland club-shaped between the lowest pair.—*Griseb. loc. cit.*; *Benth. in Fl. Bras. xv. pt. 2*, 106 & *Trans. Linn. Soc. xxvii.* 525; *Urb. Symb. Ant. iv.* 273. A specimen from Hort. Upsal., named by Linnæus, is in Herb. Linn.

Wright! *Lambert*! *March*! *Mavis Bank*, J. P. 1339, *Hart*! *Port Morant*, *Port Antonio*, *Lucea*, *Hitchcock*; *Poros*, *Lloyd*; *Hector's River*, *Harris & Britton*! *Fl. Jam.* 10,719.—West Indies, Bermuda, and tropical continental America.

Shrub, 4–10 ft. high, glabrous. *Peduncles* in the upper axils, as long as, or longer than, the leaves, the highest racemes often forming a terminal panicle. *Flowers* yellow, variable in size. *Calyx* 7–8 (10) mm. l. *Petals* 10–12 (16–18) mm. l. *Pod* stalked, subcylindrical or slightly inflated, usually straight, 6–15 cm. l., 1–1·5 cm. br., smooth, apex rounded.

4. *C. laevigata* Willd. Enum. Hort. Berol. 441 (1809); leaflets, 3–4 pairs, ovate-lanceolate, lanceolate, or elliptical, acuminate, 3–7 (8) cm. l.; glands cylindrical or ovoid, pointed, usually between each pair of leaflets.—*Collad. Hist. Cass.* 89, t. 5; *Griseb. loc. cit.*; *Benth. in Fl. Bras. xv. pt. 2*, 108 & *Trans. Linn. Soc. xxvii.* 527; *Urb. Symb. Ant. iv.* 273. *C. fruticosa erecta* foliis plurimis &c. *Browne Hist. Jam.* 223? *Seenna occidentalis* &c. *Sloane Cat.* 148 & *Hist. ii.* 48 (in part).

Sloane Herb. vi. 29*! common about the Angels, *Browne*; *Cinchona*, J. P. 601, *Hart*! *Falls River*, *Prior*.—Porto Rico, tropical continental America, tropical west Africa; also in Asia and Australia, probably introduced.

Shrub, 3–6 ft. high, glabrous. *Stipules* long, soon falling, awl-shaped to linear, 5–8 mm. l. *Racemes* axillary in the upper axils, the highest forming a terminal corymbose panicle, with yellow flowers. *Sepals* coloured, 6–10 mm. l. *Petals* veined, 12–16 mm. l. *Pod* shortly stalked, cylindrical, splitting along one margin or sometimes not splitting open, beaked with the remains of the style, 6–9 cm. l.

5. *C. spectabilis* DC. *Cat. Hort. Monsp.* 90 (1813); leaflets, 4–15 pairs, ovate-elliptical to oblong-elliptical, acute or sub-acuminate, 3–7·5 cm. l.; glands wanting.—*Collad. Hist. Cass.* 115, t. 7; *Griseb. op. cit.* 208; *Benth. in Trans. Linn. Soc. xxvii.* 529. *C. Humboldtiana* DC. *Prodr. ii.* 489 (1825). *C. Trinitatis* Reichenb. ex DC. *Prodr. ii.* 489 (1825).

March! gardens, Mandeville, Harris & Britton! Fl. Jam. 10,616.—Trinidad, Central America, northern S. America.

Tree; twigs, inflorescence, and under surface of leaves softly hairy. *Panicle* large, terminal, corymbose, with yellow flowers. *Sepals* 5–7 mm. l. *Petals* 1·5–2·5 cm. l., 3 upper obovate-elliptical, spreading, 2 lower curved over the centre of the flower, one elliptical, the other falcately oblong. *Ovary* curved, glabrous. *Pod* shortly stalked, cylindrical, irregularly constricted between the seeds, to 2·5 dm. l., about 1 cm. br. We doubt whether this species can be considered indigenous.

6. *C. occidentalis* L. *Sp. Pl.* 377 (1753); leaflets, 4–6 pairs, ovate-elliptical, ovate-lanceolate or lanceolate, acute or shortly acuminate, oblique at base, 2–7(–9) cm. l. (the lower even as small as 1 cm. l.), glabrous, but margin ciliolulate; gland at the base of the petiole, tuberculate; racemes in the upper axils, shortly stalked, with a few bright orange-yellow flowers close together, the uppermost racemes forming a short panicle.—*Collad. Hist. Cass.* 107; *Descourt. Fl. Ant. ii.* t. 135; *Macf. Jam. i.* 344; *Griseb. loc. cit.*; *Benth. in Trans. Linn. Soc. xxvii.* 532. *C. falcata* L. *loc. cit.* *C. frutescens* Mill. *Gard. Dict. ed. 8* (1768). *C. herbacea major erecta* &c. *Browne Hist. Jam.* 224. *Senna occidentalis odore* &c. *Sloane Cat.* 148 & *Hist. ii.* 48, t. 175, f. 3, 4 (in part). *Senna spuria occidentalis* &c. *Commel. Amst.* 51, t. 26. Specimen from Hort. Cliff. in Herb. Mus. Brit.; and one from Browne in Herb. Linn. named by Linnaeus.

Stinking Weed, Wild Coffee.

Sloane Herb. vi. 30! *Tate, Pasmore* in Herb. *Sloane clxii.* 261! *Houstoun!* *Browne!* *Wright!* waste places, *Broughton!* *Macfadyen!* Greenwich, *McNab!* King's House grounds, J. P. 610, *Harris!* Gordon Town, *Ball!* also *Fawcett!* Arcadia, *Mrs. Sewell!* Temple Hall, 700 ft., *Thompson!* Porus, *Lloyd!* Manchioneal; Spanish Town; *Harris!* Fl. Jam. 5999, 6786, 7993.—Tropics, “probably of American origin” (Bentham).

Herb or *undershrub*, 3–5 ft. high, stinking. *Stipules* broadly triangular, oblique at base, apex a long acute point, glabrous, very soon dropping off, 7–8 mm. l. *Sepals* green or slightly coloured, veined, 6–10 mm. l. *Petals* (white when dry) veined, 10–14 mm. l. *Stamens* 6 perfect; 3 staminodes with broad blade. *Ovary* villose. *Pod* slightly curved, 5·5–12 cm. l., 6–8 mm. br., at first flat with thickened margins, when ripe thick-compressed with broad margins, glabrous. *Seeds* “at least in the lower part of the pod, become more or less flattened and parallel with the transverse partitions; in the upper part they are sometimes flattened parallel with the valves” (Bentham).

The root is diuretic. A decoction of the leaves, taken internally and applied externally, is used as a cure for itch and other cutaneous diseases, also of mange. The seeds are used to destroy ringworm; and, roasted, they are considered to be a substitute for coffee, although analysis has failed to discover caffeine or other alkaloid in them.

C. sophera L. (Sp. Pl. 379) is reported by Bentham (Trans. Linn. Soc.) from the West Indies, and by Urban (Symb. Ant. vi. 108) from Jamaica, but we have not seen any specimen from Jamaica. The type of this species is in Herb. Hermann in Herb. Mus. Brit.; it has more numerous lanceolate equal-sided leaflets, 4–6 cm. l., and thick cylindrical gland above the base of the petiole, with larger flowers than those of *C. occidentalis* L. The specimen in Herb. Linn., named in Solander's hand, *C. sophera*, has very short or tuberculate glands, and we agree with Bentham in thinking that it is not *C. sophera* L., but probably *C. occidentalis* L.

7. *C. hirsuta* L. Sp. Pl. 378 (1753); leaflets, 3–5 pairs, ovate or ovate-lanceolate, acute or acutely acuminate, somewhat unequal-sided, villose on both sides, 4–7 cm. l., the lower smaller than the upper; gland above the base of the petiole, cylindrical; racemes axillary or terminal, short, few-flowered.—Griseb. Fl. Br. W. Ind. 209; Benth. in Fl. Bras. xv. pt. 2, 114, t. 34. f. I. & Trans. Linn. Soc. xxvii. 534; Urb. Symb. Ant. vi. 103; Hitchcock in Miss. Bot. Gard. Rep. 1893, 81. *C. caracasana* Jacq. Hort. Schoenbr. t. 270 (1798).

Port Antonio, Hitchcock.—“Caribbean Is.” tropical continental America.

Herb, erect, becoming woody below, 2–3 ft. high, stinking, covered in every part with hairs. Stipules linear-acuminate, sometimes persisting, 7–10 mm. l. Flowers like those of *C. occidentalis* L. Pod linear, narrow, more or less curved, pubescent, 15–20 cm. l., 4–6 mm. br.

We doubt whether this species is indigenous.

8. *C. ligustrina* L. Sp. Pl. 378 (1753); leaflets, 6–7 (4–8) pairs, lanceolate, oblong, or oblong-lanceolate, acute, unequal-sided, glabrous, but margin usually ciliolate, 2·5–6 cm. l., the lower smaller than the upper; gland above the base of the petiole, cylindrical to conical sometimes stalked; racemes forming a terminal corymbose panicle of large yellow flowers.—Bot. Reg. t. 109; Bot. Mag. t. 1829; Collad. Hist. Cass. 111; Griseb. op. cit. 208 (excl. syn. *C. bahamensis* Mill.); Benth. tom. cit. 534. *C. fruticosa* erecta foliis ovatis &c. Browne Hist. Jam. 223? *Senna ligustri folio* Dill. Elth. t. 259 (excl. f. 11, 12). Type in Herb. Linn.

Wright! Broughton! Masson! Distin! Charlton, near Ewarton, 1000 ft.; Malvern, 2200 ft.; Harris! Fl. Jam. 6722, 9653.—Bermuda, Florida, Cuba, Grand Cayman, Hispaniola.

A low shrub, 4–6 ft. high. Stipules linear, leafy, acuminate, very soon falling, about 7 mm. l. Sepals 6–8 mm. l. Petals veined, 1·2–1·5 cm. l. Stamens as in *C. occidentalis*. Pod flat or the valves slightly convex, glabrous, 7–10 cm. l., about 6 mm. br. Seeds flattened parallel with the valves, numerous, geminate.

9. *C. tora* L. Sp. Pl. 376 (1753); leaflets, generally 3 pairs (sometimes 2), obovate-oblong, glaucous, apex very obtuse, mucronulate, glabrous above, puberulous beneath, 2–4 (5) cm. l.; gland cylindrical-pointed, yellow, between the lowest, or the two lowest pairs.—Benth. tom. cit. 535; Urb. Symb. Ant. iv. 274.

C. obtusifolia L. *Sp. Pl.* 377 (1753); *Sw. Obs. Bot.* 158; *Macf. Jam.* i. 341; *Griseb. op. cit.* 209. *C. herbacea* major diffusa &c. *Browne Hist. Jam.* 224. *Sena minor* herbacea &c. *Sloane Cat.* 148 & *Hist. ii.* 47, *t.* 180, *f.* 5; *Dill. Elth.* *t.* 62, 63. Type in Herb. Hermann in Herb. Mus. Brit. Specimen from Browne in Herb. Linn. named *C. tora* in Solander's hand.

Common in pastures and waste places; in fl. Sept. and Oct.; St. Jago de la Vega, *Sloane Herb.* vi. 29! *Lane* in Herb. *Sloane clxii.* 261! *Browne!* *Wright!* *Parnell!* pastures, St. Mary, *Purdie!* Constant Spring, *Hitchcock*; Poros, *Lloyd*; Liguanea plain, 500 ft. *Campbell!* Hectors River, near coast, *Harris!* Providence, 700 ft., *Thompson!* Fl. Jam. 5835, 6003, 8055B.—Tropical and subtropical regions.

Annual, undershrub 2-3 ft. high. *Stipules* linear-awl-shaped, 8-13 mm. l. *Flowers* bright yellow, long-stalked, in pairs on a very short peduncle in the upper axils, the highest crowded, with shorter stalks. *Bracts* linear-lanceolate, about 5 mm. l. *Sepals* 6-8 mm. l. *Petals* 9-11 mm. l. *Pod* long, to 15 (20) cm. l., 3-6 mm. br., slender, curved or sometimes somewhat straight, slightly 4-angled, smooth. *Seeds* 20-24, obovate-rhomboidal, the longer diameter parallel with the pod, 4 mm. l.

10. *C. uniflora* Mill. *Gard. Dict. ed. 8* (1768) (non *Spreng.*); leaflets usually 4 (3-5) pairs, obovate or sometimes elliptical,

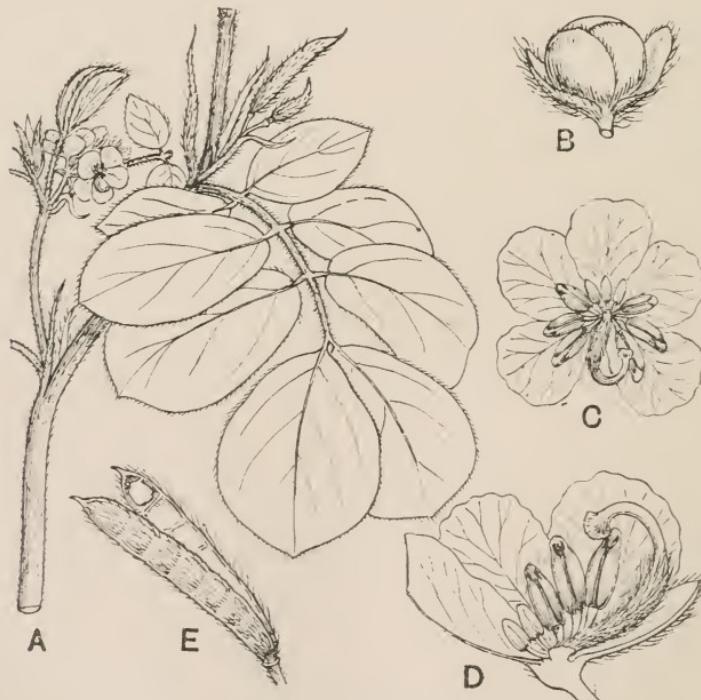


Fig. 33.—*Cassia uniflora* Mill.

A, Portion of branch showing leaf, flowers, and young pods $\times \frac{1}{2}$.
B, Calyx in bud $\times 2$.

C, Flower from above $\times 2$.
D, Part of flower cut through $\times 3$.
E, Pod, nat. size.

mucronulate, the highest larger and unequal at the base, 2–4 cm. l., covered with yellow or reddish hairs on both sides but chiefly beneath and on the margins, gland long, slender, awl-shaped, between the lowest or all the pairs. *C. sericea* Sw. *Prodr.* 66 (1788) & *Fl. Ind. Occ.* 724; *Macf. Jam.* i. 340; *Griseb. op. cit.* 209; *Beuth. in Fl. Bras.* xv. pt. 2, 116, t. 35 & *Trans. Linn. Soc.* xxvii. 536. *C. sensitiva* Jacq. *Collect. ii.* 362 (1788) & *Ic. Rar.* t. 459. Type in Herb. Mus. Brit. (Fig. 33.)

In pastures; in fl. Aug., Sept.; *Wright!* "hills of St. Dorothy and St. John," *Macfadyen!* *Distin!* Merrywood, Falmouth, Nunes! Luana Point; Long Acre Point, west of Black River; *Harris!* *Fl. Jam.* 9927, 9968.—Bahamas, Cuba, tropical continental America.

Annual, woody at base, $\frac{1}{2}$ –2 (4) ft. high; branches petioles and inflorescence bearing yellow or reddish hairs, more or less silky. *Stipules* linear-bristle-like, somewhat persistent, 6–11 mm. l. *Flowers* yellow, small, subsessile, in very short axillary racemes. *Bracts* like the stipules; bracteoles lanceolate or bristle-like, to 7 mm. l. *Sepals* 3·5–5 mm. l. *Petals* 5–7 mm. l. *Pod* transversely impressed between the seeds, linear, somewhat four-cornered, straight, erect, crowded 3–6 together on a short stalk, with reddish hairs, 2·5–5 cm. l. *Seeds* 5–10, somewhat rectangular, the longer diameter parallel with the pod, 3–3·5 mm. l.

11. *C. bahamensis* Mill. *Gard. Dict. ed. 8* (1768); leaflets, 3–5 pairs, oblong, or elliptical-oblong, obtuse, mucronulate, usually glabrous, sometimes with small hairs beneath, unequal-sided, oblique at base, 1–4 cm. l., the lower smaller than the upper; gland tuberculate between the lowest pair of leaflets or rarely below the leaflets; racemes corymbose-paniculate.—*Benth. tom. cit.* 541; *Hitchcock in Miss. Bot. Gard. Rep.* (1893), 80.

Port Morant, *Hitchcock*.—Bahamas, Florida and Keys.

Shrub. *Sepals* about 7 mm. l., more or less coloured. *Petals* veined, 9–13 mm. l. *Anthers* 2 curved, stalked, 4 straight, subsessile. *Pod* flat, 7–9(–12) cm. l., 6–7(–8) mm. br.

12. *C. biflora* L. *Sp. Pl.* 378 (1753); leaflets varying in size even sometimes on the same branch, and also in number, 7–10 (4–13) pairs, elliptical or oblong-elliptical, obtuse, the terminal pair broader at the upper end, larger, and unequal at the base, puberulous beneath and on the margin or glabrate, 2–3·5 cm. l.; gland between the lowest pair and often between the two lowest pairs, cylindrical, sometimes stalked.—*L. Amer. v. 397*; *Bot. Mag. t. 810*; *Bot. Reg. t. 1310*; *Macf. Jam.* i. 342; *Griseb. op. cit.* 208; *Benth. in Fl. Bras.* xv. pt. 2, 121 & *Trans. Linn. Soc.* xxvii. 543. *C. fruticosa* foliis minoribus &c. *Browne Hist. Jam.* 223. *C. foliolis quinque jugatis* *Plum. Pl. Amer.* (*Burm.*) t. 78, f. 1. *C. angustisiliqua* *Lam. Encyc. i.* 649 (1785). *C. crista* *Jacq. Coll. 82* (1786) & *Ic. Rar.* i. t. 74. *C. fulgens* *Macf. loc. cit.* A specimen from Browne is in Herb. Linn.

Houston! woods near Bull Bay, *Broughton!* *Macfadyen!* *Distin!* J.P. 1207 (Herb. Kew.), 2108, *Morris!* Constant Spring, *Hitchcock*; West-

phalia Road, 3000 ft.; below Flamstead, 3000 ft.; Harris! Fl. Jam. 6814, 9031.—Bahamas, tropical and subtropical continental America.

Shrub 8–12 ft. high; twigs, petioles, and inflorescence densely puberulous or glabrate. *Inflorescence* a corymbose-umbellate raceme in the upper axils, sometimes by abortion of leaves paniculate, with 2–4 showy yellow flowers, with long peduncle (2·5–3·5 cm. l.) and pedicels (1·5–1·8 cm. l.); glands 1 or 2, similar to those of the leaf, at base of the pedicels. *Bracteoles* at base of pedicels lanceolate, 4–5 mm. l., very soon falling. *Sepals* unequal, 5·5–8 mm. l. *Petals* unequal, the largest 2–2·3 cm. l., 1·5 cm. br., sessile, the smallest about $\frac{1}{2}$ as long and $\frac{1}{2}$ as broad with claw 4 mm. l., the rest intermediate. *Stamens* 3 larger, beaked, 3 or 4 smaller, blunt; staminodes 1–3, with broad blade. *Ovary* sessile. *Pod* with a very short stalk on the long pedicel and peduncle, linear, usually slightly curved, compressed, 2-valved, 14–20-seeded, 7–15 cm. l., varying from 4 to 8 mm. br.

13. *C. clarendonensis* Britton Bull. Torr. Bot. Club xlvi. 388 (1915); leaflets 10–15 pairs, elliptical, mucronulate, the uppermost 1 or 2 pairs oblong, 1–2 cm. l.; gland bluntly conical, between the lowest pairs.

Inverness, Clarendon, 200 ft.; cult. Hope Gardens; Harris! Fl. Jam. 11,693, 12,149.

Shrub about 4 ft. high, puberulous all over. *Stipules* linear-lanceolate, 3 mm. l. *Racemes* much shorter than the leaves, corymbose-umbellate, in the upper axils, with 2–6 showy yellow flowers. *Sepals* subequal, 7–9 (5–6 fide Britton) mm. l. *Petals* subequal, 13–14 (9 fide Britton) mm. l. *Stamens* 6(–7) fertile, staminodes 4(–3), with broad blade; the 2 long anthers with short beaks. *Pod* strap-shaped, slightly curved, many-seeded, impressed between pairs of seeds, 9 (7–10) cm. l., 6 mm. br. *Seeds* about 4 mm. l., ellipsoidal, transverse, puberulous.

14. *C. emarginata* L. Sp. Pl. 376 (1753); leaflets 3 (2–5) pairs, elliptical, rarely obovate-elliptical, apex rounded or emarginate, puberulous on upper surface, pubescent and soft to the touch beneath, 1·5–6·5 cm. l. (and more); glands wanting.—*Sw. Obs. Bot.* 157 (excl. syn. Mill.); *Wright Mem.* 270; *Macf. Jam.* i. 344; *Griseb. op. cit.* 207; *Benth. in Trans. Linn. Soc.* xxvii. 548; *Urb. Symb. Ant.* iv. 274. *C. minor fruticosa hexaphylla* senæ foliis *Sloane Cat.* 146 & *Hist. ii.* 44, t. 180, f. 1. *C. arborescens diffusa* &c. *Browne Hist. Jam.* 223. *C. arborescens* Mill. *Gard. Dict. ed.* 8 (1768). Sloane's specimen, the type, is in Herb. Mus. Brit.

Yellow Candle Wood, Senna Tree.

Sloane Herb. vi. 28 (excl. pods and seeds)! *Wright!* hedges and cultivated places, *Broughton!* *Shakespear!* *Macfadyen!* Savanna near Ferry, *Purdie!* *Oersted!* J.P. 1317, *Morris!* Gordon Town, *Ball!* Kingston, *Hitchcock;* Long Mountain road, 300 ft., *Campbell!* Hope grounds; the Quarry, Spanish Town; Harris! Fl. Jam. 5698, 6933.—Cuba, Hispaniola, Porto Rico, Guadeloupe, St. Vincent, Margarita, Central America, Colombia.

A shrub or small tree, not exceeding 20 ft. in height in Jamaica, but growing elsewhere to a height of 50 ft., puberulous on younger parts. *Stipules* bristle-like, 3 mm. l. *Racemes* corymbose, in the upper axils, crowded with the leaves at the ends of the branches, with numerous yellow flowers. *Bracteoles* at base of pedicels, 4–5 mm. l., soon falling. *Sepals* unequal in shape and length, 4–6·5 mm. l. *Petals* stalked, unequal in shape and size, 4 somewhat obovate, 8–10 mm. l., the fifth larger, of a

different form, somewhat S-shaped, concave, with wavy margin, about 15 mm. l. Pod strap-shaped, slightly curved, somewhat swollen along the margins, glabrous, black, many-seeded, 12–25(–35) cm. l., about 1 cm. br. The wood is used for firewood; it is hard but not large enough for general use; it was formerly exported as a dye-wood.

[*C. siamea* Lam. *Encyc.* i. 648 (1785); leaflets in 6–10(–14) pairs, lanceolate-oblong to oblong-elliptical, apex rounded or emarginate, mucronulate, glabrous on the upper surface, minutely puberulous or glabrate beneath, somewhat leathery, 3–7 cm. l.; glands wanting.—*Benth. in Trans. Linn. Soc.* xxvii. 549; *Bak. in Hook. f. Fl. Br. Ind.* ii. 264. *C. florida* Vahl *Symb. Bot.* iii. 57 (1794); *Griseb. op. cit.* 208. *C. gigantea* Bertero ex DC. *Prodr.* ii. 492 (fide *Benth.*). *C. arborea* Macf. *Jam.* i. 343 (1837).

Macfadyen; *Wilson*; *March*; *Hope Gardens* (cult.), *Harris!*—E. Indies and Malaya; introduced in the New World.

A tree, 30 ft. high and more, puberulous on younger parts. *Stipules* minute (Baker), very soon falling. *Racemes* corymbose, axillary and forming a terminal panicle, 1·5–3 dm. l., with numerous showy yellow flowers. *Bracteoles* lanceolate-awl-shaped with lunate lobes about the middle, at base of pedicels, about 6 mm. l. *Sepals* greenish-yellow, subequal, 5–7 mm. l. *Petals* stalked, not conspicuously veined, subequal, 12–16 mm. l. Pod strap-shaped, with swollen margins, nearly straight, puberulous or glabrescent, 20(–25) cm. l., 12–14 mm. br.

This species has lately been planted along the streets of Kingston.]

15. *C. alata* L. *Sp. Pl.* 378 (1753); leaflets 7–8 (6–14) pairs, large, oblong or obovate-oblong, very obtuse, 6–12 cm. l.; petiole triangular; glands wanting.—*Sw. Obs. Bot.* 162; *Wright Mem.* 198; *Descourt. Fl. Ant.* vi. t. 443; *Macf. Jam.* i. 338; *Griseb. op. cit.* 209; *Benth. in Fl. Bras.* xv. pt. 2, 126 & *Trans. Linn. Soc.* xxvii. 550; *Urb. Symb. Ant.* iv. 275. *C. herpetica* Jacq. *Obs. Bot.* ii. 24, t. 45, f. 2 (1767). *C. siliquis* quadrialatris &c. *Browne Hist. Jam.* 224. *Juglandis folio, fruticosa* &c. *Sloane Cat.* 153 & *Hist. ii.* 59, t. 175, f. 2. *Herpetica alata* Raf. *Sylva Tellur.* 123 (1838); *Cook & Coll. Contrib. U.S. Nat. Herb.* viii. pt. 2, 159, t. 39. Specimen from Hort. Cliff. in *Herb. Mus. Brit.*

Ringworm Shrub.

In fl. Nov.–April; Ferry, *Sloane Herb.* vi. 15! Ferry and Sixteen Mile Walk, *Browne*; *Swartz*; Ferry; Sulphur River, near Bath; *Macfadyen*; along river-banks, *Wullschaegel*; Port Royal; Lucca; *Hitchcock*; August Town River, 450 ft., *Campbell*! Halfway Tree, *Miss Wood*! Ferry River, 200 ft., *Harris*! *Fl. Jam.* 6296, 10,045.—Tropics.

A shrub 4–10 ft. high, glabrous. *Stipules* obliquely dilated at the base, acute or acuminate, 4–12 mm. l. *Racemes* in the upper axils or at the ends of branches, buds overlapping and forming a short cone but lengthening during flowering to 3 dm. and more. *Bracteoles* large, elliptical, orange-coloured, enclosing the stalked flower-bud, 2–2·5 cm. l., deciduous. *Sepals* orange-coloured, somewhat unequal, 13–14 mm. l. *Petals* yellow-orange, stalked, broader at the apex, veined, 15–20 mm. l. *Pod*, before opening, as it were 4-winged, by the development of a broad longitudinal wing in the middle of each valve, 10–15 cm. l., 1·5 cm. br. *Seeds* 4-cornered, compressed in the narrow transverse cells, about 7 mm. l.

"The juice of the leaves and buds has been employed in the cure of ringworm, and other cutaneous diseases. The infusion has been used, as a tepid bath, in similar cases. The flowers and young leaves, beat into a pulp, make an excellent poultice for the superficial sores which follow some varieties of impetigo and rupia" (Macfadyen).

[*C. obovata* Collad. *Hist. Cass.* 92, t. 15A (1816); leaflets in 3-7 pairs, obovate or oblong to oblanceolate-oblong or obovate-elliptical, apex broadly rounded, mucronulate, 1-4 cm. l.; glands wanting.—*Macf. Jam.* i. 340; *Griseb. op. cit.* 209; *Oliv. in Fl. Trop. Afr.* ii. 277; *Benth. in Trans. Linn. Soc.* xxvii. 553; *Bentl. & Trim. Med. Pl.* t. 89. *C. Senna L. Sp. Pl.* 377 (1753) (in part); *Sw. Obs. Bot.* 161; *Wright Mem.* 197. *C. ligustrina Mill. Gard. Dict. ed.* 8 (1768) (non *L.*). *Senna italica &c. Sloane Cat.* 148 & *Hist. ii.* 47. *S. italica Mill. Gard. Dict. ed.* 8 (1768).

Senna.

Palisadoes near Port Royal, also cultivated, *Sloane Herb.* vi. 23, 24! *Wright; Bancroft! Macfadyen! Grabham!*—West Indies (introduced). Tropical and southern Africa and western Asia to India.

Herbaceous, erect, 1-2 (4) ft. high, glaucous, glabrous, nearly puberulous. *Stipules* lanceolate, acuminate, persistent, 4-6 mm. l. *Racemes* axillary, generally longer than the leaves, many-flowered. *Bracts* 4-7 mm. l., soon falling. *Sepals* subequal, about 8 mm. l. *Petals* subequal, bright yellow, veined, about 1 cm. l. *Pod* flat, much compressed, rounded at both ends, curved, with a series of crests in the middle of the valves, one over each seed, 3-6 cm. l., 1·5-2 cm. br.

The leaflets of this species mixed with the leaflets of *C. lanceolata*, are known as Alexandrian Senna, and both species are official in the British Pharmacopœia.]

[*C. glauca* Lam. *Encyc. i.* 647 (1785); leaflets in 6-4 pairs, elliptical, apex rounded or obtuse, glaucous and puberulous or glabrescent beneath, 3-7 cm. l.; glands ovoid or cylindrical between the lower pairs of leaflets.—*Griseb. op. cit.* 208; *Benth. in Trans. Linn. Soc.* xxvii. 555; *Bak. in Hook. f. Fl. Brit. Ind.* ii. 265.

Distin! March!—West Indies (introduced), native of E. Indies, Malaya, tropical Australia, Polynesia.

A tree. *Stipules* curved, linear, 7-8 mm. l. *Racemes* axillary, corymbose, long-stalked, with large bright-yellow flowers. *Bracts* at base of the pedicels, oblong-acute, about 6 mm. l. *Sepals* yellowish, obtuse, 5-10 mm. l. *Petals* elliptical, 2-3 cm. l. *Stamens* 10 fertile, subequal. *Pod* flat, thin, straight, strap-shaped, glabrous, 1-1·5 dm. l., 13-17 mm. br.]

III. Stamens 10 or fewer, all perfect (rarely 2-4 abortive in *C. lineata*), similar, subequal; anthers linear, opening by short chinks at the apex. Pod flat, linear, elastically 2-valved.

1. Flowers in racemes, which are terminal and sometimes with solitary flowers in the upper axils. Plant viscid. Leaflets 2 pairs. Glands none or minute between the pairs.
16. *C. Absus* L. *Sp. Pl.* 376 (1753); *Jacq. Eclogæ Pl. Rar. i.* t. 53; *Griseb. op. cit.* 210; *Benth. in Trans. Linn. Soc.* xxvii. 558.

C. viscosa Macf. Jam. i. 345 (non *H. B. & K.*). The type is in Herb. Hermann in Herb. Mus. Brit.

In hedges at Rock Fort, Broughton! Liguanea, Macfadyen! King's House grounds, Harris! Fl. Jam. 6907.—Tropics of Old World, Mexico, Bolivia.

Stem a much branched erect annual, 1–2 ft. high; stem and petioles with glandular viscid hairs. *Leaves* 5–7 cm. l.; leaflets elliptical, oblique, glabrous on the upper surface, puberulous beneath, at length glabrescent, 2–3 cm. l.; petiole long, 2–4 cm. l.; stipules small, lanceolate, 3–3·5 mm. l. *Bracts* lanceolate, about 2·5 mm. l. at base of raceme, ovate, about 2 mm. l. at base of pedicel; bracteoles 2, minute, very caducous, in middle of pedicel. *Calyx* 3·5–5 mm. l., somewhat hirsute or puberulous. *Corolla* 5–7 mm. l., yellow. *Stamens* 5 (7). *Pod* linear-oblong, sparsely covered with bristly hairs, margined, 2·5–4 cm. l., 6–7 mm. br., 6–7-seeded. *Seeds* black, obovate-rhomoidal, 3·5–4 mm. l.

2. Pedicels solitary, in pairs, or in clusters, springing from a peduncle which is more or less adherent to the stem for some distance above the axil, so that the pedicels are supra-axillary.

17. *C. rotundifolia* Pers. *Syn. i.* 456 (1805); leaflets 1 pair, roundish or obovate-elliptical, very oblique, 6–18 (24) mm. l., membranous, without a gland.—*Griseb. op. cit.* 210; *Benth. in Fl. Bras. xv. pt. 2,* 161 & *Trans. Linn. Soc. xxvii.* 570. *C. bifioliatum DC. ex Collad. Hist. Cass.* 120, *t. 9, b.*

Agualta Vale, St. Mary, McNab!—Tropical continental America.

Stem prostrate, 1–1·5 ft. long, woody below, more or less puberulous, much branched from below. *Leaflets*: base semicordate, apex rounded, without a mucro, midrib exmedian,* nerves 4 or 5 from the base, pinnate, prominulous beneath, margin ciliolulate, otherwise glabrous; petiole hairy, 3–5 mm. l.; stipules ovate, cordate, ribbed, base oblique, mucronate, ciliolulate, 5–7 mm. l. *Pedicels* solitary, slightly above the axils, longer than the leaves, 1·5–2·5 cm. l. *Bracts* and bracteoles lanceolate, acuminate, bristly above, 1–1·5 mm. l. *Calyx* villose, 3·5–4 mm. l. *Corolla* a little longer than the calyx, 4–5 mm. l. *Pod* margined, puberulous, 7–8-seeded, 1·5–3 cm. l., 4 mm. br.

18. *C. pilosa* L. *Syst. ed. 10,* 1017 (1759); leaflets, 2–5 pairs, oblong, 10–25 mm. l., membranous, without a gland.—*L. Aman. v.* 378 & *Sp. Pl. ed. 2,* 540; *Sw. Obs. Bot.* 160; *Collad. Cass.* 122, *t. 20, a;* *Macf. Jam. i.* 347; *Griseb. op. cit.* 210; *Benth. in Trans. Linn. Soc. xxvii.* 570. *C. emarginata Mill. Gard. Dict. ed. 8* (1768) (non *L.*). *C. Milleri Collad. Cass.* 132 (1816). *C. mimosoides Wright Mem.* 271 (1828) (non *L.*). *C. suffruticosa erecta* hirsuta &c. *Browne Hist. Jam.* 224? (excl. syn. *L.* & *Sloane*). The type, Browne's specimen, is in Herb. Linn.

* When the midrib is in the middle of the leaf, it is *median*, about halfway between the middle and the margin *exmedian*, nearer the margin than the *exmedian* position *marginal*.

In fl. Sept.-Dec.; *Houstoun!* *Browne!* Liguanea, *Broughton!* *Distin!* "common in cane-piece intervals," *Macfadyen!* Agualta Vale, *McNab!* Kingston, *Prior!* *Wullschaegel!* Castleton, *Morris!* Constant Spring, *Hitchcock!* King's House grounds; Bull Head, 2500-2880; *Harris!* Golden Spring. *Thompson!* Fl. Jam. 6906, 8051, 12,268.—Columbia.

Stem somewhat shrubby; branches spreading, ascending, reddish, villose, 1-4 ft. long, seldom rising higher than $2\frac{1}{2}$ ft. *Leaves* 2-5 cm. l.; leaflets 3-6 mm. br., base oblique, semicordate, apex obtuse, mucronulate, midrib exmedian, nerves prominent on both sides, margin ciliolate, otherwise usually glabrous, 4-7 mm. br.; petiole (3-5 mm. l.) and rhachis villose; stipules ovate, apex acuminate-setose, semicordate at the base, ribbed, ciliate, 10-18 mm. l. *Pedicels* 1-2 (4), as long as, or longer than, the leaves, 2-4 cm. l. in flower, somewhat longer in fruit, arising slightly above the axil. *Bracts* lanceolate, 5 mm. l.; bracteoles awl-shaped, 2.5 mm. l. *Sepals* sparsely villose, 5 mm. l. *Petals* yellow, a little longer than sepals, 6-7 mm. l. *Pod* margined, puberulous, 9-13-seeded, 2-3.5 cm. l., 4 mm. br. *Seeds* somewhat rectangular, buff-coloured, 2.2 mm. l.

According to Swartz there are very minute stalked glands under the lowest leaflets.

19. *C. serpens* *L.* *Syst. ed.* 10, 1018; leaflets, 5-7 (4-9) pairs, oblong-linear, somewhat oblanceolate, 6-8 (4) mm. l., membranous, with a small flat circular long-stalked gland below the leaflets.—*L. Amæn. v.* 378 & *Sp. Pl. ed.* 2, 541; *Sw. Obs. Bot.* 161; *Griseb. loc. cit.*; *Benth. in Trans. Linn. Soc.* xxvii. 570 & in *Fl. Bras.* xv. pt. 2, 162. *C. flexuosa* *Miller Gard. Dict.* ed. 8 (non *L.*). *C. prostrata* *Humb. & Bonpl. in Willd. Enum. Hort. Berol.* (1809). *C. pygmæa* *Macf. Jam. i.* 348 (1837) (non *DC.*). *C. herbacea tenuissima* &c. *Browne Hist. Jam.* 225 (excl. syn. *L.*). [*Senna occidentalis*] *Eadem floribus pediculis longioribus insidentibus Sloane Hist. ii.* 51. The type, Brown's specimen, is in Herb. Linn., the name in Solander's hand.

Sloane *Herb.* vi. 34, 35! *Houstoun!* *Browne!* *Swartz!* *Macfadyen!* St. Andrew, *McNab!* Liguanea plain, *Campbell!* King's House grounds, *Harris!* Fl. Jam. 6020, 6911.—Cuba, Central America, tropical S. America.

Stems slender, prostrate, glabrous or puberulous, to $1\frac{1}{2}$ ft. long. *Leaves* 1-3 cm. l.; leaflets mucronulate, somewhat oblique at base, apex rounded, obscurely denticulate, glabrous, midrib exmedian, nerves 2-3 from base, pinnate on broad side, prominulous on both faces; petiole hirsute below, 2-4 mm. l., rhachis glabrous; stipules narrowly lanceolate, long acuminate, 4-6 mm. l. *Bracts* awl-shaped from a broad base, 2.5-3 mm. l.; bracteoles 2-2.5 mm. l. *Pedicels* 1.5-2.5 cm. l., solitary or rarely 2, on an almost suppressed peduncle. *Flowers* yellow, generally small. *Sepals* 4.5 mm. l. *Corolla*: petals 4-6 mm. l., sometimes twice as large. *Pod* oblong-linear, slightly margined, 5-10-seeded, pubescent with a few long weak hairs, 1.5-2.5 cm. l., 3-4 mm. br. *Seeds* somewhat rectangular, about 3 mm. l.

20. *C. lineata* *Sw. Prodr.* 66 (1788); leaflets, 2-5 (9) pairs, oblong, somewhat broader at the apex, tomentose beneath, 9-16 mm. l., leathery, with a solitary round flat or very short cylindrical sessile gland below the leaflets.—*Sw. Fl. Ind. Occ.*

726; *Macf. Jam.* i. 349; *Griseb. loc. cit.*; *Benth. in Trans. Linn. Soc.* xxvii. 572. *C. suffruticosa* et *subhirsuta* &c. *Browne Hist. Jam.* 225? Type in *Herb. Mus. Brit.*

Very common about the upper parts of Liguanea, *Browne*; waste places, *Swartz! Purdie!* Malvern, 2200 ft.; Lititz savanna, 300-900 ft.; *Harris!* Fl. Jam. 9652, 11,725.—Bahamas, Cuba.

"A dense shrub, 3 ft. high," or "a straggling shrub, up to 6 ft. high" (*Harris*); "an undershrub, 1-3 ft. high" (*Swartz*); branches puberulous. Leaves 1·5-2 cm. l.; leaflets, apex rounded or truncate, mucronulate, base oblique, midrib nearly median, nerves 2-3 on the broad side from base, 1-2 on the narrow side, pinnate, prominent beneath, glabrous on the upper surface, puberulous and soft to the touch beneath; petiole (and rhachis) pubescent, 3-4 mm. l.; stipules lanceolate, acute or acuminate, ciliolate, 3-5 mm. l. *Pedicels* solitary or 2 or 3 in clusters, axillary and shortly above the axil, 5-2 cm. l. *Bracts* lanceolate, 2-3 mm. l.; bracteoles lanceolate, close below the flower, 2 mm. l. *Calyx* more or less pubescent, 8-10 mm. l. *Corolla* yellow; petals subequal, 1·5 cm. l. *Stamens* 9-10. *Pod* oblong, slightly curved, narrowed to the base, margined, pubescent or glabrescent, 3-4 cm. l. *Seeds* 10-12, somewhat rectangular.

21. *C. polyadema DC. Pl. Rar. Jard. Genèv.* 2^e *Rapp.* 12 (1824); leaflets, 4-8 pairs, oblong or somewhat obovate-oblong, 1·5-2·5 cm. l., leathery; glands capitate, subsessile or long-stalked, one below the leaflets and often others along the rhachis.—*Griseb. op. cit.* 210; *Benth. in Trans. Linn. Soc.* xxvii. 575. *C. chamaecrista L. Sp. Pl.* 379 (in part i.e. as concerns the habitat Jamaica). *Senna occidentalis* siliqua multiplici &c. *Sloane Cat.* 149 & *Hist. ii.* 51. *Chamaecrista jamaicensis* *Britton in Bull. Torr. Bot. Club* xlvi. 515 (1915).

Sloane Herb. vi. 32! *Distin!* Pedro plain, St. Elizabeth, *Purdie!* March! Long Mountain, south side, near Kingston, 300 ft., *Harris!* Fl. Jam. 9615, 12,120.—Bahamas, Guadeloupe.

A straggling undershrub, 3-4 ft. high; branches puberulous, or at length glabrate. Leaves 3-5 cm. l.; leaflets: base oblique, apex obtuse, mucronulate, midrib exmedian, nerves prominent on both sides, glabrous, 5-9 mm. br.; petiole (and rhachis) sparsely puberulous or glabrate, 4-5 mm. l.; stipules lanceolate or linear-lanceolate, acuminate, ciliolate, 2-6 mm. l. *Pedicels* 1-3, attached at a point 2-3 mm. above the leaf-axil, about half as long as the leaves, 1·3-2 cm. l. *Bracts* ovate, long acuminate, 1-3 mm. l.; bracteoles triangular, apex bristle-like, 1·5-3 mm. l. *Sepals* sparsely puberulous or glabrate, 8-10 mm. l. *Petals* yellow, 1·1-1·5 cm. l. *Pod* sparsely puberulous, oblong, straight, 5-12-seeded, 3-5 cm. l.

22. *C. glandulosa L. Syst. ed.* 10, 1017 (1759) (excl. syn. *Breyn.*) ; leaflets usually 10-16 pairs, midrib median or nearly median, nerves numerous and close together beneath; gland funnel-shaped, long-stalked, below the leaflets, and often others along the rhachis; sepals 8-9 mm. l.; corolla long-r, petals 6-11(-13·5) mm. l.; pod pubescent or glabrate, 8-10-seeded.—*L. Amaen. v.* 378 & *Sp. Pl. ed.* 2, 542 (excl. syn. *Breyn.*) *Bot.*

Mag. t. 3435; *Macf. Jam. i.* 346; *Benth. Plant. Hartw.* 263 (non in *Trans. Linn. Soc. xxvii.* 576); *Griseb. op. cit.* 211. *C. suffruticosa* erecta foliis &c. *Browne Hist. Jam.* 225? *C. chamæcrista* *Mill. Herb.* (non *Gard. Dict.*); *Sv. Obs. Bot.* 164? *Wright Mem.* 198, 260, 295? *C. virgata* *Sv. Fl. Ind. Occ.* 728 (1798); *Macf. Jam. i.* 348; *Benth. in Trans. Linn. Soc. xxvii.* 576. The type, Browne's specimen, is in *Herb. Linn.*

Browne! ditches and wet places near Kingston, *Broughton!* *Swartz!* *Macfadyen!* *McNab!* Port Royal Mts., *Hartweg!* St. Thomas, *Purdie!* *Oersted!* *March!* Gordon Town, *Ball!* J.P. 1197, *Morris!*

Stem shrubby, erect, 2-3 ft. high; branches puberulous or glabrate. Leaves 3-9 cm. l.; leaflets oblong-linear to sub lanceolate, mucronulate, base oblique, nerves 3-4 from the base, pinnate, prominent, on the upper side not so distinctly prominent; puberulous or glabrescent beneath, glabrous above, 8-20 mm. l., 2-4.5 mm. br.; petiole (and rhachis) pubescent, 2 mm. l.; stipules lanceolate, long acuminate, 5-8 mm. l. Pedicels solitary or 2 or 3 together, above the axils, 5-2 cm. l. Bracts triangular, acuminate, ribbed, 3-4 mm. l.; bracteoles lanceolate or linear-lanceolate, 2-4 mm. l. Sepals more or less puberulous along a median line. Petals yellow. Stamens 10, 2 longer than the rest. Pod oblong-linear, 3-4 cm. l. Seeds somewhat square-shaped, dirty brown, about 2.5 mm. in diam.

"A decoction of the roots of the Cane-piece Sensitive Plant is an antidote against vegetable and fish poisons. A handful of the washed roots being boiled in water from three pints to two, may be strained, sweetened, and used for common drink, at the rate of three quarts in twenty-four hours" (Wright).

23. *C. Broughtonii* *Fawc. & Rendle in Journ. Bot. lv.* 37 (1917); leaves 7-11 cm. l.; leaflets, 19-22 (26) pairs, midrib nearly median, nerves few, distant; gland campanulate, long-stalked, below the leaflets; sepals 7-8 mm. l.; corolla not longer, petals 6-8 mm. l.; pod strongly margined, villose, about 16-seeded.

"In fossis et udis," *Broughton!* *Macfadyen!* King's House grounds, 600 ft.; *Harris!* *Fl. Jam.* 6949.—Types in *Herb. Mus. Brit.*, *Herb. Kew.*, *Herb. Jam.*, and *Broughton's collection*.

Shrub, 3 ft. high; young branches densely pubescent with curved hairs. Leaflets oblong-linear, oblique at base, scarcely so at apex, base of broad side rounded, midrib ending in a bristle-like muero, nerves 3-4 from the base, pinnate on the broad side, obsolete or slightly prominulous on the upper surface, prominulous beneath, margin ciliolulate, upper surface glabrous, lower glabrescent, 14-18 mm. l., 2-2.5 mm. br.; petiole (and rhachis) pubescent, 5-8 mm. l.; stipules lanceolate, acuminate, ribbed, ciliate, 18-14 mm. l. Pedicels 2 or 3 in axillary and supra-axillary clusters, 5-7 mm. l. Bracts ribbed, 5 mm. l.; bracteoles ribbed, 3 mm. l. Sepals pubescent. Corolla yellow. Stamens 9, 2 longer than the rest. Pod oblong-linear, 4.5-5 (2.5) cm. l., 4.5 mm. br.

24. *C. nictitans* *L. Sp. Pl.* 380 (1753); leaves 2.5-4 cm. l.; leaflets, usually 10-16 pairs, midrib submedian, nerves few beneath; gland saucer-shaped or flat and round, shortly stalked, below the leaflets; sepals 4-5 mm. l.; petals 4 not longer than sepals, one longer, 5.5-7 mm. l.; stamens usually 5 (4-6); pod

pubescent, 3·5–4·5 cm. l.—*Griseb. op. cit.* 211 (in part); *Benth. tom. cit.* 578 (in part). *Senna occidentalis* siliqua singulari &c. *Sloane Cat.* 150 & *Hist. ii.* 51. Type in Herb. Linn.

Savanna, St. Jago de la Vega, *Sloane Herb.* vi. 33 & viii. 135 (6)! *Broughton!* *Distin!* Manchester, *Purdie!* Porus, *Lloyd.*

Stem puberulous above with curved hairs, glabrescent below. *Leaflets* oblong-linear, nerves pinnate, 2–3 from the base, prominent beneath, apex obtuse, mucronate, pubescent in young state, at length glabrate, margin ciliate, 7–14 (17) mm. l., 2–2·2 (1–3) mm. br.; petiole (and rhachis) puberulous; stipules lanceolate with long acuminate bristle-like point, ciliolate on margin, 7–8 mm. l., longer than to the insertion of the gland. *Pedicels* 1–3 in clusters, 1–10 mm. above the axil, 2–5 mm. l. *Bracts* 2–4 mm. l., ribbed; bracteoles 1·2–2·5 mm. l. *Sepals* 4–5 mm. l.

25. *C. patellaria* DC. ex Collad. *Hist. Cass.* 125, t. 16 (1816); leaves 5–6 cm. l.; leaflets, 18–20 (10–25) pairs, midrib nearer the margin than the middle, nerves several, parallel; gland 1 or sometimes 2, sessile, flat, round, below the leaflets; sepals 5–6 mm. l.; petals not longer than the sepals; stamens 7–8; pod villose, 2·5–3·5 cm. l.—*Griseb. op. cit.* 211; *Benth. tom. cit.* 578.

Guys Hill, St. Thomas in the Vale, *McNab!* pastures, St. Mary, *Purdie!* *Wilson!* Robertsfield, *Fawcett!*—Cuba, Tobago, Trinidad, tropical continental America.

Stem to 3 ft., erect, densely pubescent or puberulous with curved hairs or villose. *Leaflets* oblong-linear, ending in a mucro, nerves 4–5 from the base, pinnate otherwise, prominent, very oblique both at base and apex, base of the broad side truncate, margin ciliolate, upper surface puberulous with adpressed hairs, or glabrate, lower puberulous with adpressed hairs, 10–15 mm. l., 2–3 mm. br.; petioles (and rhachis) villose; stipules lanceolate, acuminate, puberulous, ciliate, 9–12 mm. l. *Peduncle* giving off 1 or 2 erect clusters of flowers at intervals of about 5 mm. above the axil, each cluster of 2–4 flowers. *Bracts* ribbed, 4–6 mm. l.; bracteoles ribbed, 2·5–3 mm. l. *Pistil* villose. *Pod* oblong-linear, compressed, margined, 6–10-seeded. *Seeds* somewhat square, about 2 mm. l.

26. *C. fasciata* comb. nov.; leaves 7–9 cm. l.; leaflets, 10–22 pairs, midrib exmedian, nerves few beneath curved outwards along the margin; gland 1, rarely 2, cup-shaped, sessile, below the leaflets; sepals 8–8·5 mm. l.; petals, 3 longer than the sepals, 13–9·5 mm. l.; stamens 10; pod somewhat hirsute, 4–5 cm. l.—*C. chamaecrista* Macf. *Jam. i.* 346 (1837) (non L.). *C. nictitans* Griseb. *loc. cit.* (1860) (in part); *Benth. tom. cit.* 578 (in part) (non L.). *Chamaecrista fasciata* Britton in *Bull. Torr. Bot. Ant.* xxxvii. 352 (1910).

Wright! “Cane-piece intervals in seasonable districts,” *Macfadyen*; between Bath and Cuna-cuna Pass, 1000 ft., *Britton*, 3500! bed of river, Morant Bay, *Harris & Britton!* Fl. Jam. 10,641.

Herbaceous, roots apparently annual. *Stems* erect, little branched, 1½–3 ft. high, more or less pubescent with curved hairs. *Leaflets* oblong-linear, glabrous, apex obtuse or acute, mucronate, base oblique, rounded on the broad side; nerves 2–3 from the base, otherwise pinnate, prominent beneath; margins somewhat serrulate, 1·1–1·5 cm. l., 2–2·5 mm. br.; petiole

5–8 mm. l. (and rhachis), with curved hairs; stipules lanceolate, acuminate, ciliolulate, ribbed, 8–10 mm. l. Pedicels 5–8 mm. l., villose, in clusters of 3 or 4, springing from a point 1–1·5 cm. above the axil. Bracts ovate acuminate, about 4 mm. l.; bracteoles ovate-lanceolate, 3–3·5 mm. l. Pod linear, slightly curved, somewhat narrowed towards the base, margined, 9–12-seeded.

27. *C. smaragdina* Macf. *Jam. i.* 347; leaves 2–4 cm. l.; leaflets, 8–13 pairs, midrib submedian, nerves somewhat few but closer together and straighter and more upright than in *C. fasciata*; gland 1, cup-shaped, sessile, below the leaflets; sepals 7–8·5 mm. l.; petals, 2 or 3 longer than the sepals, 10–9 mm. l., the rest about 7 mm. l.; stamens 10; pod puberulous, 3–3·5 cm. l.

"Common in the mountain districts; in flower the greater part of the year," Macfadyen; Cinchona, J.P. 1258, Hart!—Hispaniola.

Stem puberulous with curved hairs. Leaflets oblong-linear, nerves pinnate, 3–4 from the base, prominent beneath, apex obtuse mucronate, glabrous on upper surface, puberulous beneath or glabrate, margin ciliolulate, 6–10 mm. l., 2 mm. br.; petiole (and rhachis) puberulous; stipules lanceolate with long acuminate bristle-like point, ciliolate on the margin, 6–10 mm. l. Pedicels solitary or 2–4 together, 2–10 mm. above the axil, 3–8 mm. l. Bracts ovate, with a long acuminate bristle-like point, ribbed, 4–6 mm. l.; bracteoles like the bracts but narrower, 3–5 mm. l. Pod 9–12-seeded.

Macfadyen gave the specific name (emerald-like) "from the beautiful bright green of the leaflets."

§ 15. Leaves composed of two leaflets united. Calyx spathaceous, 5-toothed. Petals 5. Anthers versatile. Stalk of the ovary free or adherent to the tube of the calyx; ovules 2 or more. Seeds with endosperm.

34. BAUHINIA L.

Trees or shrubs. Leaves (in Jamaican species) composed of two leaflets united. Flowers in racemes, or 2–3 together, or solitary. Receptacle (calyx-tube) cylindrical. Calyx spathaceous, 5-toothed. Petals 5, subequal. Stamens, 1 fertile, or 10 fertile in *B. tomentosa*. Pod 2-valved, splitting open.

Species about 250, widely dispersed within the tropics.

- | | | |
|-----------------------|--------------------------|------------------------|
| Petals 1·5–2·5 cm. l. | Stamens, 1 fertile..... | <i>B. divaricata</i> . |
| [Petals 4–5 cm. l.] | Stamens, 1 fertile..... | <i>B. monandra</i> .] |
| [Petals 4–5 cm. l.] | Stamens, 10 fertile..... | <i>B. tomentosa</i> .] |

B. divaricata L. *Sp. Pl.* 374 (1753); petals 1·2–2·5 cm. l., 3–6 mm. br., white changing to rose-pink; stamens, 1 fertile, much longer than the rest.—*L. Sp. Pl.* ed. 2, 535 (incl. var.); *Lam. Illustr.* t. 329, f. 3; *Miller Gard. Dict.* ed. 8; *Urb. in Jahrb. Bot. Gart. Berl.* iv. 247. *B. porrecta* Sw. *Prodr.* 66 (1788); *Jacq.*

Hort. Schoenbr. t. 100; *Bot. Mag.* t. 1708; *Macf. Jam.* i. 351. *B. aurita* Dryander in *Ait. Hort. Kew.* ii. 48. *B. foliis quinquenerviis* &c. *L. Hort. Cliff.* 156, t. 15. *B. foliis* &c. *Browne Hist. Jam.* 226. *B. foliis ovato-cordatis* &c. *Miller Ic.* t. 61. *B. inermis* &c. *Plum. Pl. Amer. (Burm.)* 32, t. 44, f. 2; *Ic. ined. i.* t. 35. *Sennae spuriae* aut *Aspalatho* &c. *Sloane Cat.* 150 & *Hist. ii.* 51. *Casparea porrecta* & *C. aurita* *Griseb. Fl. Br. W. Ind.* 213. (Fig. 34.) Specimen from *Hort. Cliff.* is in *Herb. Mus. Brit.*, also Dryander's type of *B. aurita*.



Fig. 34.—*Bauhinia divaricata* L.

A, Inflorescence with two leaves $\times \frac{1}{2}$. C, Sterile stamens opened flat $\times 2$.
B, Flower $\times \frac{1}{2}$. D, Pod $\times \frac{1}{2}$.

Mountain Ebony, Bull-Hoof.

In fl. all the year; on the hills everywhere, *Sloane Herb.* vi. 36, 37! *Barham* in *Herb. Sloane clxii.* 255! *Wright!* woods, *Broughton!* *Bertero!* common, lower hills in thickets, *Macfadyen!* *Distin!* *Parnell!* *Hartweg!* near Spanish Town, *Purdie!* *Prior!* *March!* J.P. 681, *Jenman!* *Morris!* Port Royal Mts., *Moore!* *Arcadia!* *Mrs. Sewell!* Farm Hill, *Campbell!* Porus, *Lloyd!* Buff Bay, *Thompson!* Port Antonio, *Hitchcock!* Hall's Delight; Mona woodland, 1000 ft.; Holly Mount, 2200 ft.; *Harris!* Fl. Jam. 5503, 5837, 6494, 6546, 8980.—Cayman Is., Cuba, Hispaniola, Central America.

Shrub or small tree, 6–20 ft. high. Leaves 7–(5–9-)nerved, base cordate-emarginate or truncate; leaflets united $\frac{1}{4}$ or $\frac{1}{2}$ or rarely $\frac{2}{5}$ of their length, 3–11 cm. l., glabrous on the upper surface, puberulous or glabrate beneath. Racemes with several flowers crowded together, hermaphrodite or with ovary abortive. Receptacle 3–4 mm. l., 1–1.5 mm. in diam. Calyx 12–15 mm. l., with the points free, linear or mucronate. Petals elliptical-lanceolate, with a long thread-like claw. Stamens, 1 fertile, 3–4 cm. l., the rest all sterile, 12–15 mm. l., united into a tube for $\frac{3}{4}$ – $\frac{4}{5}$ of their length. Pistil

long-stalked with exserted ovary, in hermaphrodite flowers 4–5 cm. l., in male flowers 6–10 mm. l. Pod generally only 1 in a raceme, linear or irregular in outline, 6–12 cm. l., 1–1·5 cm. br., beaked with persistent style. Seeds 3–9, flattened-ellipsoidal, 6–8 mm. l.

[*B. monandra* Kurz in *Journ. As. Soc. Beng.* *xlii.* pt. 2, 73 (1873); petals 4–5 cm. l., 2–2·5 cm. br., rosy-pink; stamens 1 fertile, much longer than the rest.—*B. Kappleri* Sagot in *Ann. Sc. Nat. sér. 6, xiii.* 317 (1882); *Urb. Symb. Ant.* i. 315 & iv. 271; *Cook & Coll. in Contr. U.S. Nat. Herb.* viii. 90, t. 19. *B. Krugii* *Urb. in Ber. Deutsch. Bot. Ges.* iii. 83, t. viii. f. 2, 9, 18 (1885).

Jerusalem Date, Butterfly Flower.

Common in gardens and fences; St. George, Watt! Ramble, Hanover, Fawcett! Lucea, Hitchcock; Hope Gardens, Harris! Fl. Jam. 12,337.—Cultivated, and, as it were, spontaneous in Jamaica and other West Indian islands, probably native in Guiana.

Shrub or small tree, 12–16 ft. high. Leaves 11–13-nerved, base truncate or shallow-cordate, 5–16 cm. l. and br.; leaflets united $\frac{1}{2}$ – $\frac{3}{4}$ of their length, glabrous on the upper surface, puberulous on the nerves beneath. Raceme few-flowered, somewhat corymbose. Pedicels about 3 cm. l., densely puberulous. Flowers hermaphrodite, or with ovary abortive. Receptacle about 3·5 cm. l., 3 mm. br. above, densely puberulous. Calyx tomentellous, with the points free, mucronate or dentate, about 2 cm. l. Petals obovate, clawed. Stamens, one fertile, 4–4·5 cm. l., the rest all sterile, 10–2 mm. l., 5 free, the rest more or less united. Pistil, stalk 2–3 cm. l., adherent to the receptacle, the free part about as long as the fertile stamen, in male flowers 4–5 mm. l.; ovary puberulous, at length glabrate. Pod generally only one in a raceme, broadly linear, straight, 18–22 cm. l., about 2·5 cm. br., with a short beak (style) 1–1·5 cm. l. Seeds 16–22, separated by a flocculent pithy substance, flattened-ellipsoidal, 10–12 mm. l., 6–8 mm. br.

"There are miles of this species used as a roadside fence plant in St. Mary. The trees are pollarded, and they then produce long pliable branches which make a good wattle fence when properly plaited" (Harris).]

[*B. tomentosa* L. Sp. Pl. 375 (1753); petals 4–5 cm. l., golden yellow with a deep purple blotch at the base of the upper one; stamens 10 fertile.—*Hook. f. in Bot. Mag.* t. 5560; *Bak. in Hook. f. Fl. Brit. Ind.* ii. 275; *Urb. in Jahrb. Bot. Gart. Berl.* iv. 251 & *Symb. Ant.* iv. 271. *B. pubescens* DC. *Lég. Mém.* 483 (1825) (fide *Urb.*). *B. ungula* Griseb. *Fl. Br. W. Ind.* 214 (1860) (in part) (non *Jacq.*). *B. variegata* Griseb. loc. cit. (non *L.*). *B. foliis subrotundis &c.* Burm. *Zeyl.* 44, t. 18. Mandaru &c. *Pluk. Phyt.* t. 44, f. 6.

Bertero; common shrub in gardens, Macfadyen; Wilson! March!—East Indies, Malay Is., China, tropical Africa.

Shrub, twigs pubescent. Leaves 5–7-nerved, roundish in outline but broader than long, base rounded or truncate; leaflets united more than halfway, apex rounded, about 5·5 (2–7) cm. l.; pubescent beneath. Flowers usually 2 together (1–3), axillary; bracteoles 2, linear, persistent, 5–7 mm. l. Receptacle 3 mm. l. Calyx 1·5–2 cm. l., dentate. Petals obovate. Stamens unequal, nearly free. Pod flat, linear, narrowed towards the base, 1–1·5 dm. l., about 1·5 cm. br. Seeds 6–10.]

§ 16. Leaves abruptly pinnate or imparipinnate (in *Crudia*) ; leaflets 2 to numerous. Sepals 4, imbricate. Petals 3, 5, or none. Anthers versatile. Stalk of the ovary adherent to the calyx-tube.

[**TAMARINDUS L.**

Tree. Leaves abruptly pinnate ; leaflets small, in numerous pairs. Racemes few-flowered, axillary or terminal, on short lateral branches. Receptacle (calyx-tube) narrowly top-shaped. Sepals 4, imbricate. Petals 3, small, one narrower than the others, with 2 rudimentary petals. Stamens, 3 perfect united into a sheath open above, the rest abortive. Ovary stalked ; stalk adnate to the hollow receptacle. Pod pulpy, not opening.

Species 1, probably indigenous in tropical Africa, widely diffused, but cultivated, in tropical and subtropical regions of America and Asia.

T. indica L. Sp. Pl. 34 (1753); Jacq. Sel. Stirp. Amer. 10, t. 10 & t. 179, f. 98 & Ed. pict. t. 13; Wright Mem. 238; Griseb. Fl. Br. W. Ind. 213; Benth. in Fl. Bras. xv. pt. 2, 227; Bentl. & Trim. Med. Pl. t. 92; Urb. Symb. Ant. iv. 270. Watt Econ. Prod. T. occidentalis Gaertn. Fruct. ii. 310, t. 146 (1791); Macf. Jam. i. 335. T. officinalis Hook. Bot. Mag. t. 4563 (1851). *Tamarindus Sloane Cat.* 147 & *Hist. ii.* 45; Browne *Hist. Jam.* 125. Type in Herb. Linn.

Tamarind.

Cultivated; Houstoun! Wright! Macfadyen; Constant Spring, Hitchcock; Porus, Lloyd; Berwick, 2000 ft., Harris! Brandon Hill, 1200 ft., Thompson! Fl. Jam. 6535, 8084.—For distribution, see under genus.

A large tree without prickles, usually to 30 or 40 ft. high, but in the open plains often a very large tree with a diameter of 5 ft. Leaflets in 8-20 pairs, oblong, apex rounded, base unequal-sided, about 2 cm. l. Bracteoles boat-shaped enclosing the bud, soon falling, about 11 mm. l. Petals about as long as the calyx, white or pale yellow with red veins, nearly 1.5 cm. l. Pod 7-15 cm. l., 2.5 cm. br. Seeds 2-8.

The pulp of West Indian Tamarinds is official in the British Pharmacopœia and in that of the United States. The wood is yellowish-white, hard and close-grained; heart-wood small, dark purplish brown. The timber is highly prized though extremely difficult to work, and is used chiefly for wheels, mallets, planes, furniture, &c. It is also excellent for turning purposes, and is one of the woods preferred for making gunpowder charcoal. It is also much prized for fuel when great heat is necessary, as in brick-making. From the liability of the tree to become hollow in the centre it is difficult to get a plank of any width. (Watt)]

35. HYMENÆA L.

Trees, without prickles. Leaves 2-foliolate; leaflets leathery, unequal-sided, with pellucid dots. Flowers white, in short terminal panicles, densely corymbose. Receptacle (calyx-tube)

campanulate. Sepals 4, very imbricate. Petals 5, sessile, ovate-elliptical, a little unequal, the uppermost often larger. Stamens 10, free, glabrous. Ovary shortly stalked; stalk adherent to the hollow receptacle. Pod somewhat woody, large, not opening. Seeds few.

Species 8, natives of tropical America.

H. Courbaril L. Sp. Pl. 1192 (1753) & ed. 2, 537; Gaertn. Fruct. ii. t. 145; Descourt. Fl. Ant. v. t. 359; Hayne Arzneyk. Gew. xi. t. 10; Macf. Jam. i. 349; Griseb. Fl. Br. W. Ind. 213; Benth. in. Fl. Bras. xv. pt. 2, 235; Cook & Coll. in Contrib. U.S. Nat. Herb. viii. 164, t. 41; Urb. Symb. Ant. iv. 270. H. foliis &c. Browne Hist. Jam. 221. Resina pici &c. Sloane Cat. 215 & Hist.

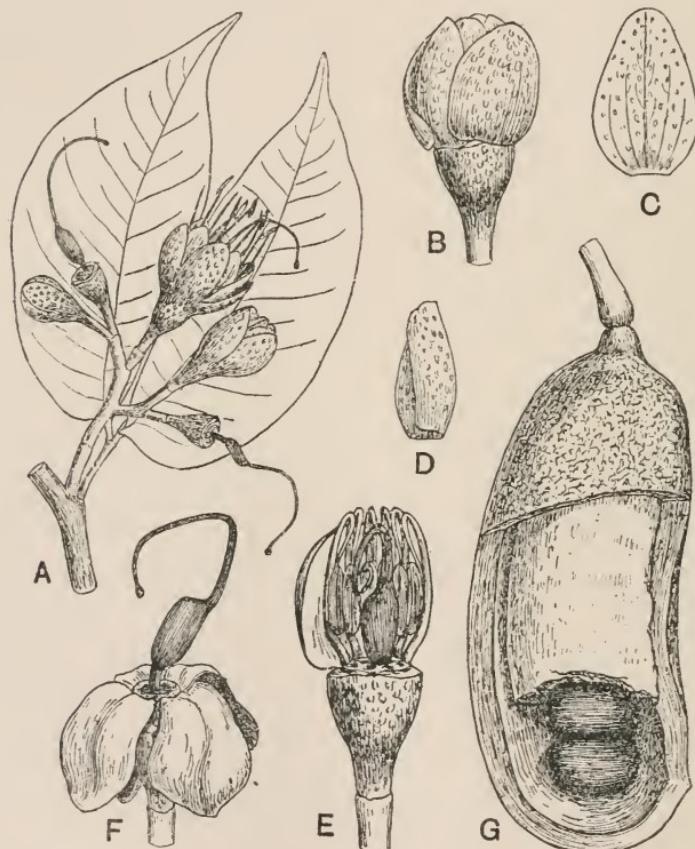


Fig. 35.—*Hymenæa Courbaril L.*

- A, Portion of inflorescence with a leaf $\times \frac{2}{3}$.
- B, Bud, nat. size.
- C, D, Petals, nat. size.
- E, Bud with some of the parts removed, nat. size.
- F, Flower after pollination, petals and stamens removed, nat. size.
- G, Pod with portion removed to show pulp and seeds $\times \frac{1}{2}$.

ii. 186, t. 141, f. 4, 5. Courbaril *Plum. Nov. Pl. Amer. Gen.* 49.
Ceratia diphyllos &c. Pluk. Phyt. t. 82, f. 3. (Fig. 35.)

Plukenet's specimen is in Herb. Sloane. A specimen named by Linnaeus is in Herb. Linn.

West Indian Locust Tree, Stinking Toe.

Plukenet in Herb. Sloane xcvi. 157 & xcix. 184! Sloane, pods! Liguanea, Browne; common in Liguanea and the plains of St. Elizabeth, Macfadyen; St. Andrew, McNab! Purdie; Poros, Lloyd; near Kingston, Campbell! Hope grounds, Harris! Fl. Jam. 614.—West Indies, tropical continental America.

Tree 30–60 ft. high, with wide-spreading branches, and glabrous twigs and leaves. Leaflets oblong to ovate, shortly acuminate, curved inwards, the inner side only half as broad as the outer, 6–9 cm. l. Receptacle 7–9 mm. l. Calyx 1·5 cm. l. Petals white, thin, with pellucid dots, scarcely longer than the calyx. Stamens 3–3·5 cm. l., white. Pod thick, compressed, chocolate coloured, rough, 5–1 dm. (2·2) l., 3–4·5(–10) cm. br., with 2 or more seeds imbedded in thick mealy pulp.

"The resin is frequently brought from Surinam on the main Continent of America to Jamaica, where 'tis very much valued and prized for its Virtues in curing Aches, &c." (Sloane). "A fine transparent resin exudes between the principal roots. It is the Gum Animi of the shops. It requires highly rectified spirits of wine to dissolve it, and makes the finest varnish known, superior even to the Chinese lacca. It burns readily, emitting a grateful and fragrant smell, and has been empl'yed by way of fumigation in attacks of spasmodic asthma and other embarrassments of respiration. In solution, it is given internally in doses of a teaspoonful, as a substitute for Gum Guiacum, for rheumatic complaints, and employed externally as an embrocation. A decoction of the inner bark is said to act as a vermifuge. The wood is considered an excellent timber; is extremely hard, of a close texture, taking a fine polish, and is well adapted for making the cogs of wheels in machinery" (Macfadyen). Browne and Macfadyen are doubtful whether the tree is a true native, but we see no reason for declining to consider it indigenous.

36. CRUDIA Schreb.

Trees. Leaves imparipinnate; leaflets alternate. Racemes simple, terminal or lateral on last year's twigs. Bract and bracteoles lasting as long as the flower in the Jamaican species. Receptacle (calyx-tube) short. Sepals 4, imbricate. Petals none. Stamens 10 (8, 9), free; anthers versatile. Ovules few (about 4). Pod sessile, woody or leathery, flat-compressed, obovate-roundish or oblong, opening after some time at the margins. Seeds large, 1 or 2.

Species 10, mostly natives of tropical America, 1 of tropical Africa, 1 of East Indian archipelago, and 1 of Ceylon.

C. spicata Willd. Sp. Pl. ii. 539 (1799); Griseb. Fl. Br. W. Ind. 216. **C. antillana** Urb. Symb. Ant. vi. 10 (1909). Apalatoa spicata Aubl. Pl. Guian. i. 383, t. 147 (excl. f. 5 and 6) (1775). Type in Herb. Mus. Brit. (Fig. 36.)

Cacoön.

Great Morass, Westmoreland, Purdie! Lacovia, on banks of Black River; edge of Great Morass, Negril; banks of Cabaritta river, Meylersfield; Harris! Fl. Jam. 9915, 10,247, 11,811.—Hispaniola, Guiana.

Tree to 50 ft. high; branches spreading, drooping. Leaflets 7-9(-13), alternate or the lowest subopposite, oblong or elliptical-oblong, base more or less unequal-sided, apex acuminate, glabrous, 7-13 cm. l., 2-4 cm. br., veins prominulous on both sides. Bract narrowly elliptical, about 6 mm. l.

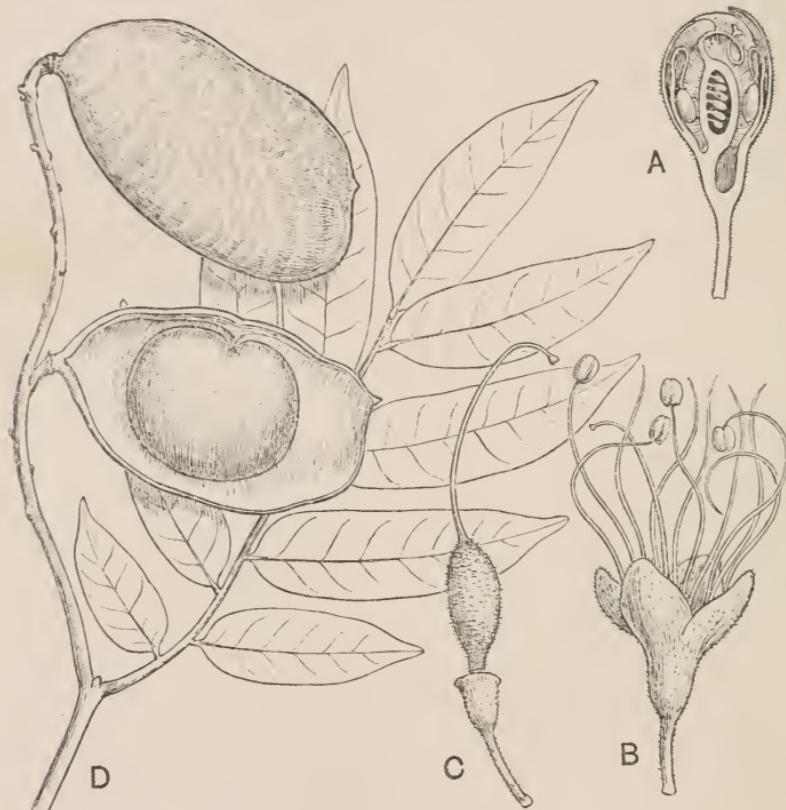


Fig. 36.—*Crudia*.

A, Bud of *C. obliqua* Griseb. cut length-wise $\times 3$.

B, Flower of ditto $\times 3$.

C, Pistil of ditto enlarged after the fall of the sepals and stamens $\times 8$.

D, Leaf and pods of *C. spicata* Willd., the valve of one pod removed to show the seed $\times \frac{1}{2}$.

(A, B, C after Fl. Bras.)

Bracteoles elliptical, about 8 mm. l. *Receptacle* about 2 mm. l. *Sepals* veiny, puberulous, about 6 mm. l. *Pod* 7-10 cm. l., 5-6.5 cm. br., tomentose, nerves prominent, branching and towards the centre forming a net-work. *Seeds* somewhat kidney-shaped, compressed, 4.5-6 cm. l., 3.5-4 cm. br.

The distinguishing characters which Urban gives for his *C. antillana* are not confirmed by comparison of Jamaican specimens with Aublet's original specimen in Herb. Mus. Brit.

§ 17. Leaves abruptly pinnate; leaflets in 1 or 2 pairs. Sepals 5, very imbricate. Petals none. Anthers versatile. Ovules 2.

37. PRIORIA Griseb.

Tree. Leaves abruptly pinnate; leaflets large, in 1 or 2 pairs. Flowers small, in interrupted spikes; spikes paniculate, axillary and terminal. Bracteoles united into a 2-lobed cupule equalling



Fig. 37.—*Prioria copaifera* Griseb.

A, Leaf and inflorescence $\times \frac{1}{2}$.

B, Flower $\times 7$.

C, Pistil $\times 7$.

D, Pod $\times \frac{1}{2}$.

(After Benth.)

the receptacle (calyx-tube). Receptacle short. Sepals 5, roundish, subpetaloid, very imbricate. Petals none. Stamens 10, free; anthers versatile. Ovules 2. Pod obliquely obovate-roundish, flat-compressed, woody, 2-valved. Seed 1, pendulous, large.

Species 1, native of Jamaica and Central America.

P. copaifera Griseb. *Fl. Br. W. Ind.* 215 (1860); *Benth. in Trans. Linn. Soc. xxiii.* 390, t. 40. (Fig. 37.)

Bachelors Hall, near Bath, Wilson! Mansfield, near Bath; Meylersfield; Harris! Bachelors Hall, common at 600 ft., Harris & Britton! Fl. Jam. 6001, 10,575, 11,814.—Panama.

Tree 35 to 100 ft. high, 3-4 ft. in diam., glabrous. Leaflets elliptical or ovate-elliptical, slightly curved inwards, sides somewhat unequal, apex sometimes shortly and abruptly acuminate, with pellucid dots, veins prominulous on both sides, 7-16 cm. l. Bracteoles exceeding 1 mm. l. Flowers pale yellow, strongly scented. Sepals about 2·5 mm. l.; margin minutely ciliolate. Stamens 5 mm. l.; filaments hairy below; apex of connective fleshy, conical, appearing below the reversed anther. Pod 7-10 cm. l., and about as broad, one side convex, the other flat or concave, marked by longitudinal somewhat prominent veins running from the base and sides and uniting at the apex, not splitting open, the seed germinating in the pod and growing out at the apex.

SUBFAMILY 3. MIMOSEÆ.

Flowers regular, parts of the flower generally in 5's, small, in globular heads or cylindrical spikes. Sepals valvate. Petals equal in number to the sepals, valvate, distinct or united into a lobed corolla, hypogynous. Stamens equal in number to the sepals, or twice as many, or numerous; filaments distinct, or united below into a tube, or adhering at the base to the tube of the corolla; anthers small, versatile. Radicle straight, shortly exserted or enclosed. Leaves bipinnate, but pinnate in *Inga*.

§ 18. Parts of the flower in 5's. Stamens 10, distinct; anthers with a small gland, which falls soon after the opening of the flower. Pollen granules numerous, distinct.

38. ENTADA Adans.

Climbing shrubs; stem often very long. Leaves with the uppermost pair of pinnæ converted into tendrils in *E. gigas*. Calyx campanulate, 5-toothed. Stamens shortly exserted. Pod sometimes very large, flat-compressed, jointed; the joints 1-seeded, separating from each other, and leaving a continuous persistent margin.

Species 10, of which 1 is found widely distributed in the tropics, 3 are confined to tropical America, and 6 are African.

E. gigas comb. nov. *E. scandens* Benth. in Hook. Journ. Bot. iv. 332 (1842); Griseb. Fl. Br. W. Ind. 216; Benth. in Trans. Linn. Soc. xxx. 363. *E. gigalobium* DC. Prodr. ii. 424 (1825); Macf. Jam. i. 303. *Perim Kaku Valli Rheed.* Mal. viii. 59, t. 32, 33, 34. *Phaseolus maximus* perennis folio &c. Sloane Cat. 68 & Hist. i. 178. *Gigalobium* &c. Browne Hist. Jam. 362. *Mimosa gigas* L. Fl. Jam. 22 (1759); Amœn. v. 384 (1760). *M. scandens* L. Sp. Pl. ed. 2, 1501 (1763); Sw. Obs. Bot. 389; Wright Mem.

305. *Acacia scandens* Willd. *Sp. Pl.* iv. 1057 (1805); *Tussac Fl. Ant.* iii. 79, t. 21; *Descourt. Fl. Ant.* iii. t. 200. Purse cocoon *Lindsay Ic. ined.* *Gigalobium scandens* *Hitchcock in Miss. Bot.*

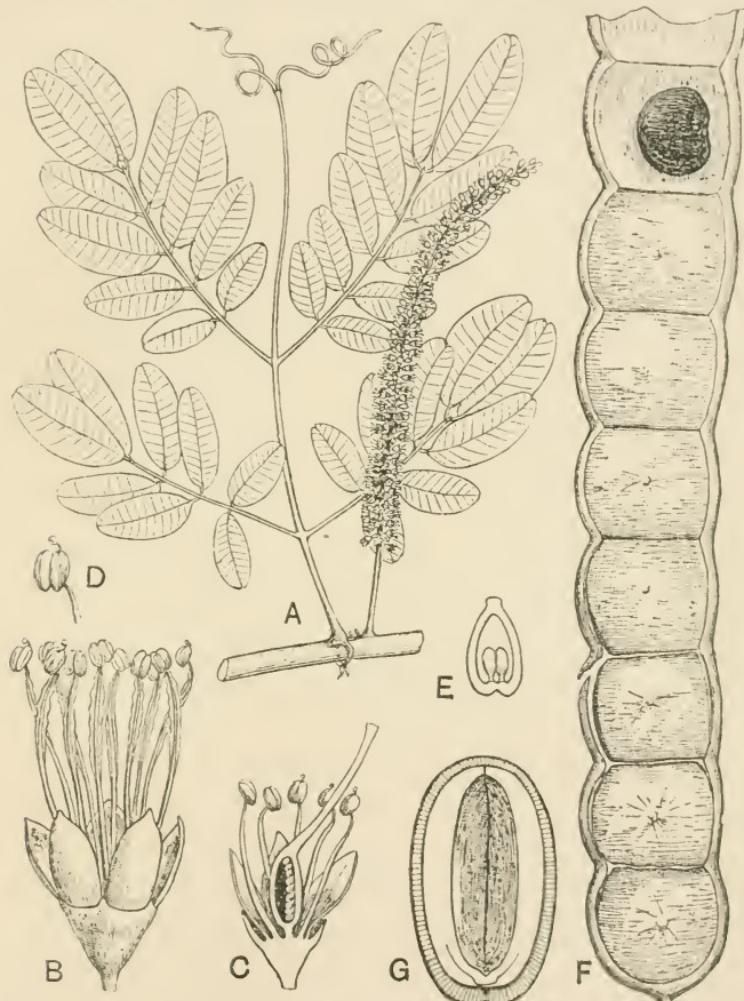


Fig. 38.—*Entada gigas* Fawc. & Rendle.

A, Leaf and inflorescence $\times \frac{1}{2}$.

F, Portion of pod, with the valve of one joint removed to show seed, $\times \frac{1}{2}$.

B, Male flower $\times 4$.

G, Seed cut across, showing the cavity between the cotyledons.

C, Fertile flower cut lengthwise $\times 4$.

D, Anther with gland $\times 8$.

E, Ovary cut across $\times 7$.

Gard. Rep. (1893), 82. (Fig. 38.) A specimen grown in Hort. Upsal. named by Linnaeus is in Herb. Linn.

Cocoon, Cacoön, Mafootoo Withe.

"Thickets, beyond Mt. Diablo; Moneague Savanna; hills between Guanaboa and Mountain River Plantations," *Sloane Herb.* iii. 67*, 68!

Masson! St. George, *McNab!* *Prior!* J.P. 979, *Hart!* Port Antonio, *Hitchcock*; Castleton, *Thompson!* also *Harris!* Fl. Jam. 7251.—Hispaniola, Guadeloupe, St. Vincent, tropical continental America, subtropical S. Africa, tropical Africa, Australia, Polynesia, and Asia.

Stem climbing along the tops of shrubs or high trees, often 100–150 ft. long, and covering acres of woodland. *Pinnae* in 2 (or 1) pairs; leaflets in 4 or 5 (2-)pairs, obliquely oblong-elliptical, blunt or emarginate, slightly curved inwards, sides unequal, 2–8 cm. l.; stipules awl-shaped, adpressed, about .5 cm. l. *Spikes* usually solitary (sometimes 2), longer than the leaves, springing from a point about .5 cm. above the axil, with tufted glands between the axil and the insertion, occasionally ending in a tendril (Macfadyen); flowers numerous, small, crowded. *Bracteoles* persistent, 1–1.5 mm. l. *Calyx* about 1.5 mm. l. *Petals* 5, oblong, greenish-yellow or green, 3–4 mm. l. *Stamens* 10, twice as long as the petals, twisted; anthers sometimes bearing a minute stalked gland. *Pistil* sometimes abortive. *Pod* very large, 1–2 m. l., 1 dm. or more br., twisted in various directions, 10–12-seeded. *Seeds* roundish-compressed, 5 cm. in diam.; cotyledons separated by a large median air-space which reduces the specific gravity of the seed and so enables it to float.

The seeds are found cast up by the sea, not only on the Palisadoes in Jamaica, but also on the shores of north-west Europe; there are specimens in Sloane's fruit collection of seeds cast up in the Hebrides and Orkney Is.

39. PIPTADENIA Benth.

Trees or shrubs, without spines or prickles (in *P. peregrina*). Leaflets small, in numerous pairs; glands on the petiole and between the terminal pinnae. Flowers in globular heads (in *P. peregrina*); peduncles axillary, solitary or clustered, becoming paniculate at the ends of the branches. Parts of the flowers sometimes in 4's. Calyx campanulate, toothed. Petals united to about the middle. Stamens exserted. Pod broadly flat, 2-valved, continuous within.

Species 38, mostly natives of tropical America, a few in tropical Africa.

P. peregrina Benth. in Hook. *Journ. Bot.* iv. 340 (1842) (in part), in *Fl. Bras.* xv. pt. 2, 282 & in *Trans. Linn. Soc.* xxx. 373, 647; *Urb. Symb. Ant.* iv. 269. *Mimosa peregrina* L. *Sp. Pl.* 520 (1753). *Acacia peregrina* Willd. *Sp. Pl.* iv. 1073 (1806). *A. angustiloba* DC. *Prodr.* ii. 470 (1825). *A. trichophylloides* Macf. *Jam.* i. 320 (1837). (Fig. 39.)

Bastard Tamarind.

"Fl. May, June, common Port Royal Mts.," Macfadyen.—Hispaniola, Porto Rico, Dominica, St. Vincent, Trinidad, tropical and subtropical S. America.

Shrub or tree, 10–40 ft. high. Leaves 1.5–2 dm. l.; pinnae in 10–13 pairs, 3.5–5 cm. l.; leaflets in 35–40 pairs, linear, unequal-sided, especially at the base, 2–4 mm. l. Peduncles generally 4 in a cluster, 3–4 cm. l. Flowers white; heads with stamens about 1.5 cm. in diam. Calyx 2 mm. l., puberulous on the outside. Corolla 3 mm. l., puberulous on the outside. Stamens more than twice as long as the corolla. Pod 1–2 dm. l., 1.5–2.5

cm. br., leathery, margins slightly enlarged, somewhat constricted between the seeds; surface with leprous markings.

We have not seen any specimen from Jamaica, but follow Bentham in considering Macfadyen's *Acacia trichophylloides* as a synonym.

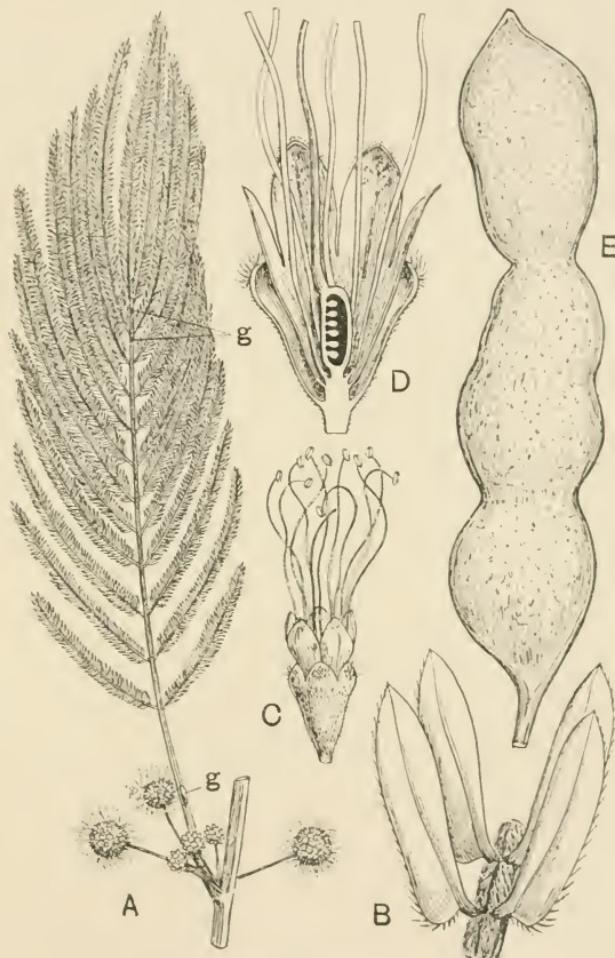


Fig. 39.—*Piptadenia peregrina* Benth.

A, Single leaf with inflorescence $\times \frac{2}{3}$;

g, gland.

B, Several leaflets enlarged.

C, Flower $\times 5$.

D, Ditto cut lengthwise.

E, Pod $\times \frac{2}{3}$.

[ADENANTHERA L.]

Trees. Leaflets alternate, 12–18 in *A. pavonina*. Flowers minute, crowded in long slender racemes, hermaphrodite or polygamous. Calyx campanulate, shortly toothed. Stamens scarcely exserted. Pod strap-shaped, swollen at the ends, 2-valved, the valves much twisted after they separate.

Species 3 or 4, natives of tropical Asia, Africa and Australia, of which one (*A. pavonina*) is cultivated or spontaneous throughout the tropics.

A. pavonina L. Sp. Pl. 384 (1753); Jacq. Coll. iv. t. 23; Wight. Ill. t. 80; Griseb. Fl. Br. W. Ind. 217; Bedd. Fl. Sylv. t. 46; Benth. in Trans. Linn. Soc. xxx. 375 & in Fl. Bras. xv. pt. 2, 288; Bak. in Hook. f. Fl. Br. Ind. ii. 287; Watt Econ. Prod. i. 107; Urb. Symb. Ant. iv. 269. Type in Herb. Hermann in Herb. Mus. Brit.

Circassian Seed.

Naturalized; *Wullschaegel*; Moneague, Prior! very common in Clarendon, Harris! Fl. Jam. 11,075; Port Antonio, Hitchcock.—India, Ceylon, Ma'ay Islands, Philippines, China; introduced in America (incl. W. Indies), also perhaps in Africa and Australia.

Tree to 40 ft. high. *Pinnæ* in 2-5 pairs, 1-2 dm. l.; leaflets elliptical or oblong-elliptical, very obtuse, 2-4 cm. l. *Racemes* 5-15 cm. l.; simple from the axils of the leaves, panicled at the end of branches. *Flowers* orange-coloured, 3-4 mm. l., pedicels as long. *Pod* 15-25 cm. l., 12-16 mm. br., curved. *Seeds* 10-12, of the same colour all over, usually bright scarlet, varying in Jamaican specimens from 6-10 mm. br.

"The heart-wood is red, hard, close-grained, durable and strong. The timber is used in southern India for house-building and cabinet-making purposes . . . The seeds are used as weights in India, each being about 4 grains; they are also strung and made into necklaces. Powdered and beaten up with borax, they give a good cement" (Watt).]

[PROSOPIS L.]

Trees or shrubs. Leaves with pinnæ in 1 or 2 pairs; leaflets in few to many pairs. Flowers small, in axillary spikes in *P. juliflora*. Calyx campanulate, shortly toothed. Stamens exserted. Pod linear, not opening, thick, spongy, with the seeds each in a separate cell.

Species 25, natives of tropical and subtropical regions, but chiefly American.

P. juliflora DC. Prodr. ii. 447 (1825); Macf. Jam. i. 311; Griseb. Fl. Br. W. Ind. 217; Benth. in Fl. Bras. xv. pt. 2, 289 & Trans. Linn. Soc. xxx. 377; Sarg. Silv. iii. 101, t. 136, 137. *P. horrida* Kunth *Mimos.* 106, t. 33 and *P. dulcis* Kunth op. cit. 110, t. 34 (1822). *Mimosa diffusa* &c. Browne Hist. Jam. 252. *M. juliflora* Sw. Prodr. 85 (1788) & Fl. Ind. Occ. 986 (misprint *piliflora*); Descourt. Fl. Ant. viii. t. 550. *Acacia juliflora* Willd. Sp. Pl. iv. 1076 (1805). *M. salinarum* Vahl Eclog. Am. iii. 35 (1807). *A. salinarum* DC. Prodr. ii. 456 (1825); Macf. Jam. i. 313.

Cashaw.

Houston! Browne; Shakspear! Masson! Salt Ponds district, von Rohr; Macfadyen; Oersted! Prior; Hope, Fawcett! Kingston; Constant Spring,

Hitchcock; Long Mt. road, 250 ft.; Hope; Harris! Fl. Jam. 5667, 6980, S525.—West tropical and subtropical N. and S. America. Browne states that it was “introduced from the main continent, and thrives very luxuriantly in many parts of the low lands.” There is no specimen in Sloane’s Herbarium.

A glabrous shrub or tree, 15–40 ft. high, generally with axillary spines. Leaflets, 20–15 (6–30) pairs, oblong to linear, 5–13 mm. l., 1·5–4 mm. br. (continental specimens often much longer); rhachis with sessile glands. Spikes 5–10 cm. l., 3 to 4 together, densely crowded with small yellow fragrant flowers. Calyx a little over 1 mm. l. Petals woolly inside near the apex, 3 mm. l. Stamens about 4 mm. l. Pod generally one in each spike, curved or nearly straight, 15–20 (5–) cm. l., 6–16 mm. br., at length 6–8 mm. thick, with sweetish pulp.

“The wood is heavy, hard, and close grained, although not very strong ... It is almost indestructible in contact with the soil, and is valued for fence posts and railway ties ... It is sometimes used in furniture, for the felloes of heavy wheels, and for the pavement of city streets; and it affords the best and often the only fuel in the regions where it grows, burning slowly with a bright clear flame. It produces valuable charcoal, but is unsuited to the generation of steam on account of the destructive action upon boilers of the tannin which it contains ... An astringent decoction obtained by boiling chips of the heart-wood may be used to check diarrhea or dysentery, or by infusion to purify muddy or stagnant water ... A gum resembling gum arabic exudes from its stems” (Sargent).]

40. NEPTUNIA Lour.

Herbs. Leaflets small. Stipules obliquely cordate. Flower-heads on axillary peduncles; upper flowers hermaphrodite; lower male or neuter with small calyx and corolla and 10 petaloid long-exserted staminodes. Stamens generally 10, exserted. Pod obliquely oblong, short, broad, flat, 2-valved, more or less divided between the seeds.

Species 8, natives of North and South America, Asia and tropical Australia, of which one, a floating plant, is found widespread throughout the tropics.

1. *N. oleracea* Lour. *Fl. Coch.* 654 (1790); *Griseb. Fl. Br. W. Ind.* 217; *Benth. in Fl. Bras.* xv. pt. 2, 290, t. 78 & in *Trans Linn. Soc.* xxv. 383. *Mimosa lacustris* Humb. & Bonpl. *Pl. Equin.* i. 55, t. 16 (1806). (Fig. 40.)

Ponds, near Hodges Pen, St. Elizabeth, Purdie!—Tropical America, Asia, and Africa.

Glabrous herbs, with spongy stem frequently floating by means of hollow swellings, and branching and rooting so as to cover shallow waters or swamps; stem swellings 1–2 cm. thick. Leaves 5–7 cm. l.; rhachis without a gland. Pinnae in the upper part of the petiole, in 2 or 3 pairs, 4–5 cm. l. Leaflets in 8–20 pairs, linear-oblong, 6–12 mm. l. Stipules broadly and obliquely cordate, acute, 5–7 mm. l. Peduncles axillary, 7–13 cm. l. in flower, longer in fruit. Bracts, 1 or 2 about the middle of the peduncle, ovate, 4–12 mm. l. Flower-heads white, changing to yellow, ellipsoidal in bud, becoming hemispherical in flower, with numerous sterile flowers radiating from the base. Sterile flowers with small or obsolete calyx, 5 petals, 2–4 mm. l., and 10 narrowly linear-lanceolate

staminodes, 7-14 mm. l. Perfect flowers sessile, calyx 2 mm. l., petals 4 mm. l., stamens twice as long as the petals. Pod 2-2·5 cm. l., .8-1 cm. br., flat, mucronate, bent down at a right angle from the stalk (5-8 mm. l.). Seeds 5-8 (3-9), obovate, brownish-black, about .5 cm. l.

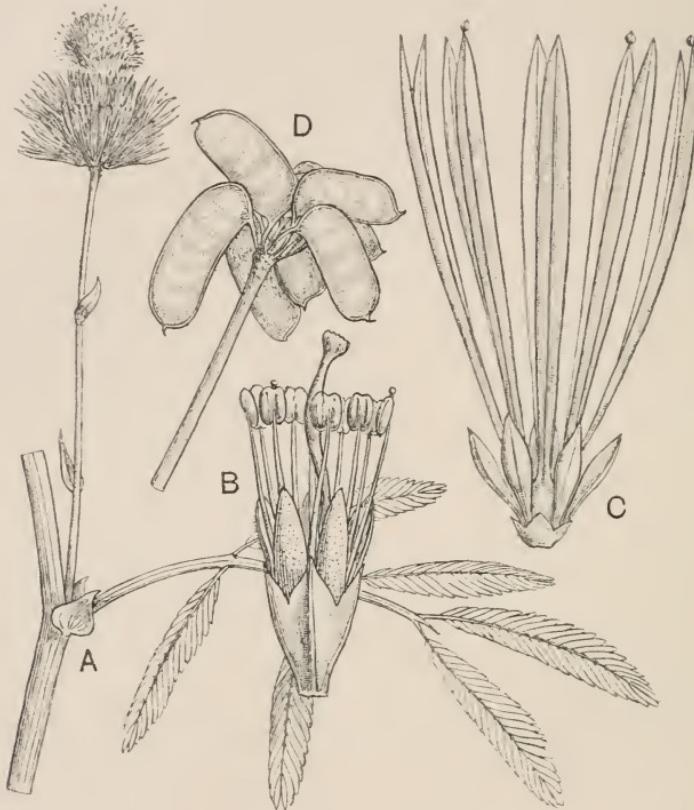


Fig. 40.—*Neptunia oleracea* Lour.

A, Leaf and inflorescence $\times \frac{2}{3}$.
B, Flower $\times 5$.
C, Sterile flower $\times 3$.
D, Head of pods $\times \frac{2}{3}$.
(A, B, C after Fl. Bras.)

2. N. *plena* Benth. in *Hook. Journ. Bot.* iv. 355 (1842); Benth. in *Fl. Bras.* xv. pt. 2, 291 & in *Trans. Linn. Soc.* xxv. 383; Lindl. *Bot. Reg.* 1846, t. 3; Griseb. *op. cit.* 218; Urb. *Symb. Ant.* iv. 268. *Mimosa non spinosa palustris et herbacea procumbens, flore luteo pleno Houst. MSS.* 165, f. 92. M. *foliis duplicato-pinnatis spicarum &c.* L. *Hort. Upsal.* 145. M. *plena L. Sp. Pl.* 519 (1753); *Miller Ic.* 122, t. 182, f. 2; *Houst. Reliq.* 10, t. 23. M. *frutescens media inermis &c.* *Browne Hist. Jam.* 253. M. *punctata L. Syst. ed.* 10, 1311 (1759). *Herba mimosa non spinosa platyceratos &c.* *Sloane Cat.* 152 & *Hist. ii.* 57.

Desmanthus punctatus Willd. *Sp. Pl.* iv. 1047 (1806). A specimen named by Linnaeus (*M. plena*), and another from Browne named by Linnaeus *M. punctata*, are in Herb. Linn.

Sixteen Mile Walk, *Sloane* Herb. vi. 47, 48! Browne! *Wullschlaegel*; Pond, Old Hope, Westmoreland, *Harris*! Fl. Jam. 11,826.—Bahamas, West Indies, tropical continental America, also tropical Asia, but probably introduced (Bentham).

Very like *N. oleracea* Lour. and perhaps not separable as a distinct species. Both Grisebach and Bentham treat them as distinct, relying on the following characters for *N. plena*: *Pinnæ*, 3–5 pairs; rhachis bearing a sessile gland just below the lowest pair of leaflets. Leaflets 12–40 pairs. Pod larger (to 5 cm. l.), more erect. Seeds 5–20. Plant more terrestrial.

§ 19. Parts of the flower in 5's or 4's. Stamens as many as, or twice as many as, the petals; anthers without glands. Pollen granules numerous, distinct.

41. DESMANTHUS Willd.

Perennial herbs or undershrubs. Leaflets very small; a sessile cup-shaped gland just below the lowest pair. Stiuples bristle-like, persistent. Flower-heads on solitary axillary stalks. Floral parts in 5's. Calyx campanulate, toothed. Petals free or slightly cohering. Stamens 10 (rarely 5), free, exserted. Pod linear, flat-compressed, 2-valved.

Species 8 or 9, natives of North and South America and West Indies, one (*D. virgatus*) widely dispersed throughout tropical and subtropical regions.

D. virgatus Willd. *Sp. Pl.* iv. 1047 (1806); *Griseb. Fl. Br. W. Ind.* 218; *Benth. in Fl. Bras.* xv. pt. 2, 293, t. 79 & in *Trans. Linn. Soc.* xxv. 385; *Urb. Symb. Aut.* iv. 268. *D. depresso* Humb. & Bonpl. ex Willd. *Sp. Pl.* iv. 1046 (1806); *Kunth Mimos.* 115, t. 35 (1822); *Benth. loc. cit.* *D. strictus* Bertol. in *Giorn. Arcad.* xxi. 190

(1824); *DC. Prodr.* ii. 445; *Macf. Jam.* i. 310. *D. pratorum* Macf. Jam. i. 311 (1837). *Mimosa americana pigra* &c. *Pluk.*

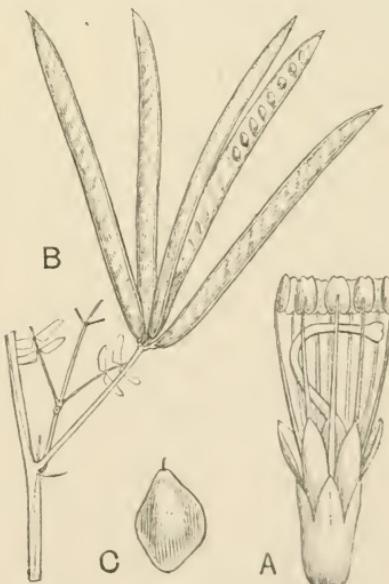


Fig. 41.—*Desmanthus virgatus* Willd.

A, Flower $\times 5$.
B, Peduncle and ripe pods $\times \frac{3}{2}$.
C, Seed much enlarged.
(A, C after *Fl. Bras.*)

Phyt. t. 307, f. 3. Herba mimosa non spinosa &c. *Sloane Cat.* 153 & *Hist.* ii. 58. *Mimosa virgata L. Sp. Pl.* 519 (1753) : *Jacq. Hort. Vindob.* 34, t. 80. *M. pernambucana L. loc. cit.* *Acuan virgatum Medik. Theod.* 62 (1786). (Fig. 41.) Type in Herb. Linn.

Ground Tamarind.

Near St. Jago de la Vega and in other places, *Sloane Herb.* vi. 50! Old Harbour, *Broughton!* *Bancroft!* Liguanea plain; Lucky Valley, Port Royal Mts.; Oxford, St. Thomas in the East; *Macfadyen!* March! Green Valley, J.P. 1858, *Morris!* King's House, J.P. 1848, *Hart!* Kingston; Port Morant; *Hitchcock!* Mona, *Campbell!* Ewarton, 1000 ft.; Hope grounds; *Harris!* Fl. Jam. 5871, 6670, 11,931.—Tropical and subtropical regions.

Shrub erect, 2-4(-6) ft. high, or branches diffuse or prostrate; branches angular or somewhat 4-cornered above and terete below. *Pinnæ* 2-5(-7) pairs, 1·5-4·5 cm. l.; leaflets 10-25 pairs, linear or oblong-linear, 4-8 mm. l.; gland cup-like, ovate or circular. Flower-heads with 6-8 whitish flowers. *Calyx* about 2·5 mm. l. Petals about 4 mm. l. Stamens at length about twice as long as the corolla; anthers sometimes aborted in the lower flowers. Pod 6·5-8(-8) cm. l., 3-4 mm. br., linear. Seeds 10-20 or more.

Bentham retains *D. depressus* Humb. & Bonpl. as a species distinct from *D. virgatus* Willd.; the distinguishing features are the weak, less angular and more procumbent stem; pinnæ generally not more than 1·5 cm. l., in 1-5 pairs; leaflets smaller and narrower, in 10-20 pairs; and much smaller gland. It seems to us merely a weak form of the species, a view which is borne out by Macfadyen's detailed descriptions of his two species.

42. MIMOSA L.

Herbs, shrubs or trees. Leaves generally sensitive, usually without glands on the stalks. Flower-heads stalked. Flowers hermaphrodite or polygamous; parts of the flowers in 4's. Calyx generally minute, inconspicuous. Petals more or less united. Stamens as many, or twice as many, as the petals, generally twice as long, rosy or white, free. Pod compressed, 2-valved; valves separating from the entire thickened border, and breaking up into joints with 1 seed in each joint.

Species about 300, mostly natives of tropical America, a few of Africa and Asia, none in Australia.

Herbs, sometimes woody below in *M. pudica*.

Without prickles. Pinnæ, in 1 pair 1. *M. viva*.

With prickles. Pinnæ subdigitate, in 2 pairs 2. *M. pudica*.

Shrubs or trees.

Pinnæ in 4-8 pairs.

[Flower-heads white. Stipels minute prickles *M. bimucronata*.]

Flower-heads rosy. Stipels bristle-like 3. *M. invisa*.

[Pinnæ in 8-15 pairs. Flower-heads pale rosy-lilac *M. pigra*.]

1. *M. viva L. Sp. Pl.* 517 (1753); a very small prostrate glabrous herb, without prickles, rooting at the nodes.—*Macf. Jam. i.* 304; *Griseb. Fl. Br. W. Ind.* 218; *Benth. in Trans. Linn. Soc. xxx.* 392. *M. herbacea non spinosa minima* &c. *Sloane Cat.*

153 & *Hist. ii.* 58, *t.* 182, *f.* 7. *M. minima* &c. *Browne Hist. Jam.* 254. A specimen from Browne, named by Linnaeus, is in Herb. Linn. Specimen from Sloane, the type, is in Herb. Mus. Brit.

Magotty and Moneague savannas, *Sloane Herb.* vi. 49! *Browne!* *Wright!* St. Ann; between Port Morant and Morant Bay; *Broughton!* *Swartz!* East Prospect, St. Thomas in the East, *Macfadyen*; Moneague, *Prior!* Moneague, *Fawcett!*—Cuba.

Leaf extremely sensitive to touch. *Pinnæ*, 1 pair, 1–2 cm. l.; leaflets in 4 pairs, oblong, blunt, 3–5 mm. l.; petiole 1–2 cm. l. *Flower-heads* ovate or globular, few-flowered; peduncles solitary, axillary, about as long as the petiole. *Stamens* as many as the petals, and twice as long. *Pod* ovoid, bristly in the centre of the valves, 1-jointed, 5–6 mm. l.

"This small plant grows in patches, densely covering the ground for several feet in extent. It is perhaps the most sensitive of its kind, its leaves affected even by the breeze, and instantly collapsing on being touched, so that you may write your name on a bed of it, by means of a stick drawn lightly over the surface, and the letters will remain legible for several minutes" (*Macfadyen*).

2. *M. pudica* L. *Sp. Pl.* 518 (1753) (excl. syn. *Breyn.*, *Comm.*): a prickly herb, stems woody at the base, long, prostrate, some-



Fig. 42.—*Mimosa pudica* L.

Leaves expanded and closed. Flowers in bud and open.
Pods showing how the borders break away.

times more or less erect and subshrubby; leaves subdigitately pinnate, the pinnae being close together in 2 pairs (or sometimes some leaves have only 1 pair); leaflets in 15–27 pairs.—*Bot. Reg.* t. 941; *Macf. loc. cit.*; *Griseb. op. cit.* 219; *Benth. tom. cit.* 397, & in *Fl. Bras.* xv. pt. 2, 316. *M. aculeata* foliis quadripinnatis *Plum. Pl. Amer. (Burm.)* t. 202. (Fig. 42.) A specimen from Browne, named by Linnaeus, is in Herb. Linn.

Shame Weed.

Browne! *Masson!* *Prior!* Cavalier's Pen, J.P. 1378, *Syme!* Kingston, *Clute!* Bog Walk; Port Morant; Lucea, *Hitchcock*; Porus, *Lloyd*; Ginger Piece, Blue Mts., J.P. 1428, *Campbell!* Cedar Valley, Watt! Pittsfield, 500 ft.; Scott's Hall, 700 ft.; *Thompson!* Fl. Jam. 6755, 7916; Swamp, Golden Grove, Miss Walter!—A common weed in tropical America (incl. W. Indies), naturalized in many parts of tropical Africa and Asia.

Stems 3–6 (9) dm. l., glabrous or hispid, with prickles below the stipules, and also scattered along the internodes. Leaf sensitive to the touch; pinnae 2–9 cm. l.; leaflets linear, acute, very oblique at base, 5–1 cm. l., with villose adpressed hairs on margin and generally on under surface; petiole (and rhachis) glabrous or hispid, 1·5–6 cm. l. Stipules lanceolate or linear-lanceolate with villose margins, 5–10 mm. l. Flower-heads rosy, ellipsoidal or globular. Peduncles solitary or 2–3 together, about as long as, or shorter than, the petiole. Bract below each flower, 1–2 mm. l., linear with glabrous margin and shorter than the flower-bud, or linear-spathulate with long villose hairs on the margin and longer than the flower-bud. Calyx about 2 mm. l. Corolla about 2 mm. l. Stamens as many as the petals and twice or thrice as long. Pod 1–1·5 cm. l., 3–4 mm. br., margins with bristles, persistent; valves glabrous, smooth, 3–4-jointed.

There are two forms:—

a. form *hispidior* *Benth.*, hispid; stipules long, 6–10 mm. l.; bracts with villose margins, longer than the flower-bud, 2 mm. l.

b. form *glabrior* *Benth.*, more or less glabrous; stipules shorter, 4–5 mm. l.; bracts with glabrous margins, shorter than the flower-bud, 1–1·5 mm. l. Further investigation in the field is required to determine whether these are distinct forms, or whether they pass into one another.

This species is a troublesome weed in pastures, as the prickles wound the mouths of stock feeding where it grows, and are even dangerous to young calves. The weed has to be cut out by hand labour, or sheep are used to feed it down. The leaves are very sensitive.

[*M. bimucronata* *Kuntze Rev. Gen. Pl.* i. 198 (1891); shrub or tree to 25 ft. high, with (or occasionally without) prickles; pinnae in 4–8 pairs; stipels in the form of 2 minute prickles; flower-heads white, in a panicle.—*M. sepiaria* *Benth. in Hook. Journ. Bot.* iv. 395 (1842), in *Fl. Bras.* xv. pt. 2, 364, t. 91 & in *Trans. Linn. Soc.* xxx. 423. *M. thyrsoidea* *Griseb. loc. cit.* (1860). *Acacia bimucronata* *DC. Prodr.* ii. 469 (1825).

Brazil Macca.

Near Christiana, *Harris!* Spaldings, *Miss Wood!* Hanbury, near Kendal, *Harris & Britton!* Fl. Jam. 8242, 10,625.—Brazil, Paraguay; naturalized in Jamaica, Singapore, and southern China.

Pinnae 2·5–5 cm. l.; leaflets in numerous pairs, linear-oblong, midrib submedian, 5·5–10 mm. l.; stipules bristle-like, 4–5 mm. l., soon falling.

Flower-heads globular, 5–6 mm. in diam. without the stamens, many-flowered, forming a terminal panicle often 3 dm. l. *Calyx* about .7 mm. l. *Corolla* about 2·5 mm. l. *Stamens* twice as many as the petals and thrice as long. *Pod* flat, glabrous, without prickles, 4–5 cm. l., 7–8 mm. br.; valves 5–8-jointed. Used for making hedges.]

3. *M. invisa* Mart. in *Flora xx. Beibl.* 121 (1837); shrub or undershrub, with pubescent angled stems several feet long, trailing over bushes and climbing by means of numerous recurved prickles on stems and petioles; pinnae in 5 or 6 (4–8) pairs, with a bristle between the pinnae; stipels bristle-like; flower-heads rosy, 1 or 2 in axils; peduncle much shorter than the petiole.—*Benth.* in *Fl. Bras. xv. pt. 2*, 379, t. 97 & *Trans. Linn. Soc. xxx.* 436; *Urb. Symb. Ant. vi.* 103. *M. diplotricha* Wright in *Savv. Pl. Cub.* 34 (1868). *Schranksia brachycarpa* Benth. in *Hook. Journ. Bot. ii.* 130 (1840); *Griseb. Fl. Br. W. Ind.* 220. An authentic specimen from Martius is in Herb. Mus. Brit.

St. Cruz, 450 ft., Harris! Fl. 9863.—Cuba, Trinidad, tropical continental America.

Leaves 4–11 cm. l.; pinnae 2–4 cm. l.; bristle and stipels about 2 mm. l.; leaflets in numerous pairs, oblong, 4–5 mm. l.; petiole 5–6 cm. l. *Flower-heads* globular; peduncle barely 1 cm. l. *Calyx* minute, about .3 mm. l. *Corolla* about 2 mm. l. *Stamens* twice as many as the petals, 2–2½ times as long. *Pod* 1·5–2·5 cm. l., 5–6 mm. br., margins spiny; valves pubescent, bristly, 4 or 5-jointed.

[*M. pigra* L. *Cent. Pl. i.* 13 (1755) & *Sp. Pl. ed. 2*, 1507; shrub 4–8 ft. high, with long straggling hispid prickly branches; pinnae in 8–15 pairs with a spine between the pinnae, and generally with 2 prickles in the interval between the insertion of the pairs; flower-heads pale rosy-lilac, shortly stalked, 1 or 2 in the axils of the young leaves.—*Sw. Obs. Bot.* 392. *M. asperata* L. *Syst. ed. 10*, 1312 (1759) & *Sp. Pl. ed. 2*, 1507; *Macf. Jam. i.* 305; *DC. Lég. t. 63*; *Griseb. loc. cit.*; *Oliv. Fl. Trop. Afr. ii.* 335; *Benth.* in *Fl. Bras. xv. pt. 2*, 381 & *Trans. Linn. Soc. xxx.* 437. *M. pellita* Humb. & Bonpl. ex Willd. *Sp. Pl. iv.* 1037; *Kunth Mimos.* 27, t. 9. *Æschynomene spinosa quarta* &c *Breyn. Cent. Prim.* 43, t. 19. *Æ. spinosa quinta* *Breyn. Cent. Prim.* 44, t. 20; *Commel. Amst. i.* 59, t. 30. *Mimosa caule fruticoso* &c *Miller Ic. t. 182*. *M. frutescens spinosa* &c *Browne Hist. Jam.* 253.

Wright! Westmoreland, *Purdie!* Lucea, *Hitchcock*; in wet places, Montpelier, St. James; Meylersfield; *Harris!* Fl. Jam. 11,807, 11,815.—Tropical America, and widely spread over tropical and subtropical Africa and the Mascarene islands.

Leaves to 1·5 dm. l.; pinnae 2–4·5 cm. l.; spine 2–10 mm. l.; leaflets in many pairs (generally more than 30), linear, pubescent beneath, sensitive to touch, 5–8 mm. l. (the petiole is not sensitive). *Flower-heads* globular, 9 or 10 mm. in diam. without the stamens; stalk as long as the head, or 2–3 times longer. *Calyx* about 2 mm. l., with a ciliate-fringed margin. *Corolla* 4-cleft, hispidulous at and near the upper margin, 4 mm. l. *Stamens* twice as many as petals, 1½–2 times as long. *Pods*

generally several in each head, 3-6 cm. l., 10-12 mm. br., flat, valves very hispid, 10-20(-30) jointed.

Browne (*loc. cit.*) states that this species was introduced from Panama, "and is now cultivated in some of the gardens of the curious, but is yet rare."

43. LEUCÆNA Benth.

Trees. Gland in the middle of the petiole, or just below the pinnæ, or sometimes wanting, sessile, somewhat elliptical. Flower-heads globose, white, stalked. Floral parts in 5's. Calyx tubular-campanulate, toothed. Petals free. Stamens 10, free, exserted. Pod shortly stalked, broadly linear, flat-compressed, rigidly membranous, 2-valved; seeds compressed, transverse to the valves; embryo enclosed on its two sides by a thin layer of horny endosperm.

Species 10, natives of tropical America, one occurring throughout the tropics, spontaneous or cultivated, and one found in the islands of the Pacific.

- | | |
|---------------------------|----------------------------|
| Pinnæ in 4-8 pairs..... | 1. <i>L. glauca</i> . |
| Pinnæ in 10-25 pairs..... | 2. <i>L. brachycarpa</i> . |

1. *L. glauca* Benth. in *Hook. Journ. Bot.* iv. 416 (1842); pinnæ in 4-8 pairs, 6-8 cm. l.; leaflets in 10-12 pairs, oblong-falcate, oblique, unequal-sided, glaucous or paler beneath, 7-12 mm. l., 2-3.5 mm. br.—*Benth. in Fl. Bras.* xv. pt. 2, 391 & in *Trans. Linn. Soc.* xxx. 443; *Griseb. Fl. Br. W. Ind.* 220; *Sarg. Silv.* iii. 111, t. 139; *Cook & Coll. Contrib. U.S. Nat. Herb.* viii. 175; *Urb. Symb. Ant.* iv. 266. *Mimosa glauca* L. *Sp. Pl.* 520 (1753).

Prior; *March*; *Port Morant*; *Lucea*; *Hitchcock*; *Hart!* *Hope*; *Papine*; *Harris!* *Fl. Jam.* 6713, 8367.—Warmer regions of the New and the Old World, probably of American origin.

Shrub or slender tree 15-20 ft. high. Flower-heads (excl. stamens) about 1.4 cm. in diam., with numerous flowers; peduncles axillary, 1, or 2-3 together, 3-5 cm. l., racemose at the end of the branches. Calyx about 2.3 mm. l. Petals 4.4 mm. l. Stamens twice as long as petals. Pods generally many in the same head, 10-15 cm. l., 1-1.7 cm. br. Seeds numerous, oblong, 6 mm. l., with a long thread-like stalk.

This species grows in very dry places, and is sometimes browsed by horses and mules, in which case the hair is affected, the mane and tail dropping, and even the hoofs falling off, if eating the leaves is persisted in.

2. *L. brachycarpa* Urb. *Symb. Ant.* ii. 265 (1900); pinnae in 10-25 pairs, up to 3.5 cm. l., leaflets in 25-55 pairs, linear-oblong, acute, 2-4 mm. l., .6 mm. br.

Hope grounds, *Campbell!* *Westphalia*, *Watt!* *Berwick*, *Fawcett!* below *Content Gap*, *St. Andrew*, 3200 ft.,; near *Guava Ridge*, 3500 ft.; *Harris!* *Fl. Jam.* 12,342, 12,393.—*Martinique*, *Mexico*.

Tree. Flower-heads (excl. stamens) about .8 cm. in diam., with numerous flowers; peduncles axillary, generally 2 together, 1-2 cm. l. Calyx 1.5-2 mm. l. Petals about twice as long. Pods 1-5 in each head, 6-11 cm. l., 1-2 cm. br.

§ 20. Parts of the flower in 5's or 4's. Flowers in globular heads, or in spikes (in *A. suma*). Stamens numerous, distinct or only slightly united at the base. Pollen granules in 2-6 masses in each cell.

44. ACACIA Willd.

Trees or shrubs, with or without prickles or spines. Leaflets generally small (less than 1 cm. l., but to 1·4 cm. in *A. rugata*), in numerous pairs, generally with a gland on the petiole. Stipules spiny or inconspicuous. Flowers in globular heads or cylindrical spikes. Peduncles axillary, solitary or clustered, or paniculate at the apex of branches. Flowers small, hermaphrodite or polygamous; floral parts in 5's or 4's. Calyx campanulate, toothed, lobed, or divided into distinct sepals. Stamens numerous, free or slightly united at the base, exserted; anthers small; pollen aggregated in 2-6 masses in each cell. Pod compressed, rarely cylindrical, 2-valved or not opening.

Species 450, widely dispersed through the warmer regions of the world, especially numerous in Australia and Africa.

§ 1. Stipules spiny, otherwise without spines or prickles.

Flowers in globular heads.

Involucel close under flower-heads.

Leaflets in 20-30 pairs, 2-3 mm. l..... 1. *A. lutea*.

Leaflets in 10-20 pairs, 4-5 mm. l.

Pod velvety, obscurely veined, 8-14 cm. l., 7-8

mm. br..... 2. *A. tortuosa*.

[Pod glabrous, with longitudinal lines, 4-7 cm. l.,

8-15 mm. br..... *A. farnesiana*.]

A. nilotica.]

[Involucel about middle of peduncle.....

§ 2. Stipules not spiny; prickles in pairs below the stipules, or scattered.

[Prickles in pairs below the stipules. Flowers in spikes.....

A. suma.]

Prickles scattered. Flowers in globular heads.

Pod velvety, glaucous..... 3. *A. riparia*.

[Pod glabrous, constricted between the seeds..... *A. rugata*.]

§ 3. Without spines or prickles. Flowers in short spikes or oblong heads

4. *A. villosa*.

§ 1. Shrubs or trees, stipules some or all spiny, otherwise without prickles or spines. Flower-heads globular; peduncles axillary, solitary or in a small cluster, or subracemose at the ends of the branches. Pod thick, swollen or rarely flat, not or scarcely splitting open, with a spongy pulp separating the seeds.

A. Involucel of bracts close under the flower-head.

1. A. *lutea* Hitchcock in Rep. Miss. Bot. Gard. (1893) 83; pinnæ in 40-10 (60-8) pairs; leaflets in 20-30 (15-40) pairs,

2-3 (1.5-4) mm. l.; spines when small slender, the larger 2.5-9 cm. l., a little dilated, terete or rarely angled or concave above; pod tomentose, puberulous, or glabrescent, 7-8 (5-10) cm. l., 1.9-1.2 cm. br., longitudinally net-veined (at length obscurely).—*A. macracantha* Humb. & Bonpl. in Willd. *Sp. Pl.* iv. 1080 (1806); Kunth *Mimos.* t. 28; Griseb. *Fl. Br. W. Ind.* 221; Benth. in *Trans. Linn. Soc.* xxx. 500. *A. macracanthoides* & *A. subinermis* Bert. ex DC. *Prodr.* ii. 463 (1825); Macf. *Jam.* i. 317. *A. microcephala* Macf. *Jam.* i. 316 (1837). *Mimosa lutea* Miller *Gard. Dict.* ed. 8 (1768). The type, Miller's specimen from Houstoun, is in Herb. Mus. Brit.

Wild Tamarind, Park Nut.

St. Jago de la Vega and thence to Passage fort, Sloane Herb. vi. 42! *Pasmore* in Herb. Sloane clvii. 268! *Houstoun*! *Broughton*! *Bancroft*! *Windward Road*; Salt Ponds district; *Macfadyen*! *Oersted*! *Wilson*; *Prior*; *March*! Constant Spring, *Hitchcock*; King's House grounds, J.P. 1322, and Hope grounds, *Fawcett*! near Halberstadt, 2000 ft.; Cane River valley, 1200 ft.; Albion Mt., St. Thomas, 150-200 ft.; *Harris*! Fl. Jam. 6730, 7405, 10,106, 11,857.—Hispaniola, Guadeloupe, tropical continental America, and subtropical S. America.

Tree or shrub, 15-40 ft. high; twigs and leaf-stalks puberulous or glabrous. *Pinnæ* variable in length, 5-20 cm. l.; leaflets oblong-linear. *Glands* sessile, occurring irregularly at the base of the petiole, and between the *pinnæ*, sometimes wanting. *Flowers* yellow, fragrant. *Calyx* 1.5-1.7 mm. l. *Corolla* 2.2-2.5 mm. l. *Pod* generally straight, rarely curved, subterete or somewhat compressed, continuous or more or less constricted between the seeds.

This species, and the two following, can be grown as hedges, if properly pruned. The trunk sometimes attains a diameter of $1\frac{1}{2}$ to 2 feet; the wood is used for making charcoal, and also as fire-wood.

2. *A. tortuosa* Willd. *Sp. Pl.* iv. 1083 (1805); *pinnæ* in 2-8 pairs; leaflets in 10-20 pairs, 4-5(-7) mm. l.; spines thick, the larger terete, 2-4 cm. l.; pod puberulous or glabrate, continuous or slightly constricted between the seeds, obscurely longitudinally veined, 8-14 cm. l., 7-8 mm. br.—*Macf. Jam.* i. 315; *Griseb. op. cit.* 222; *Benth. tom. cit.* 501. *Mimosa tortuosa* &c. *Browne Hist. Jam.* 251. *M. tortuosa* L. *Syst. ed.* 10, 1312 (1759) & *Amaen. v.* 384, 411; *Sw. Obs. Bot.* 391; *Wright Mem.* 225. *M. salinarum* von Rohr in Herb. Mus. Brit. (non Vahl). The type, Browne's specimen, is in Herb. Linn.

Wild Poponax, Acacia Bush.

Houstoun! *Browne*! *Broughton*! Salines opposite Port Royal, von Rohr! *Bancroft*; *Gosse*! *Wilson*; *Prior*; *Hope*, J.P. 997, *Morris*! Port Royal, *Hitchcock*; Latimer Pen, *Campbell*! near Kingston, *G. Douet*! Delta of Hope River, *Harris*! Fl. Jam. 5873, 9386.—Texas, St. Thomas, St. Cruz, Montserrat, St. Vincent, Central America, Galapagos Is., Colombia, Venezuela.

Shrub or low tree, 10-15 ft.; branches spreading; twigs and leaf-stalks pubescent or glabrescent. *Pinnæ* 1.5-3 cm. l.; leaflets oblong-linear, blunt; veins slightly prominent. *Gland* oblong, sessile below lowest *pinnæ*, and a circular one usually between the 1-3 terminal. *Calyx* 1.2-

1·5 mm. l. Corolla about 2 mm. l. Stamens about twice as long as the corolla. Pod subterete, straight or curved, constricted or not, between the seeds.

Vahl describes, under the name *Mimosa salinarum*, a specimen collected by von Rohr in the Salt Ponds district of Jamaica, which, from the description, is evidently *Prosopis juliflora* DC.

"The pods are richly impregnated with a sticky astringent gum, which may be easily extracted; and would prove an excellent medicine, where rough astringents are requisite" (Browne).

[*A. farnesiana* Willd. *Sp. Pl. iv.* 1083 (1806); pinnæ in 4–5 (2–8) pairs; leaflets in 10–20(–25) pairs, 4–5 mm. l.; spines slender, terete, the smaller 4–8 mm. l., the larger to 1·5 cm. l.; pod glabrous, cylindrical or spindle-shaped, thick, swollen, marked with longitudinal lines, 4–7 cm. l. 8–15 mm. br. and thick.—*Griseb. Fl. Br. W. Ind.* 222; *Benth. in Fl. Bras. xv. pt. 2,* 394 & in *Trans. Linn. Soc. xxx.* 502; *Bedd. Fl. Sylv. i. t. 52;* *Bak. in Hook. f. Fl. Br. Ind. ii.* 292; *Watt Econ. Prod. i.* 48; *Sarg. Silv. iii.* 119, t. 141; *Urb. Symb. Ant. iv.* 265; *Guppy Plants &c. in W. Indies,* 166. *A. americana* &c. *Sloane Cat.* 152 & *Hist. ii.* 56 (in part). *Mimosa farnesiana* L. *Sp. Pl.* 521 (1753); *Descourt. Fl. Ant. i. t. 1.* *Vachellia farnesiana* *Wight & Arn. Prodri.* 272; *Wight Ic. t. 300.* (Fig. 43.)

Cassie Flower.

Sloane Herb. vi. 44! *Catesby!* *Wright!* *Par nell!* *Wilson!* *March!* *Ball!* *Lucea, Hitchcock.* —Tropical and subtropical regions, probably indigenous in western America, in Australia, and in south tropical Africa.

Shrub or low tree; twigs and leaf-stalks puberulous or glabrescent. Pinnæ 2–4 cm. l.; leaflets oblong-linear, blunt; veins slightly prominent. Calyx 1–1·5 mm. l. Corolla 2–3 mm. l.

The distilled flowers yield a delicious perfume. A tree gives 2 lbs. of flowers, valued at 3d. to 4d. per lb.; an acre in south Europe brings in £30 to £40. The gum is looked upon as good as, or better than, gum arabic (Watt). See also "Perfumery and Essential Oil Record," March, 1916. The wood is hard, heavy, and close-grained; used in India for agricultural implements.]

B. Involucel of bracts persistent about the middle of the peduncle.

[*A. nilotica* Delile *Fl. Ægypt. Illustr.* 79 (1812); pinnæ in 4–8 (1–3) pairs; leaflets in 10–30 pairs, 4–6 mm. l.; spines, the smaller straight (rarely recurved), the larger 2·5–5(–7) cm. l.; pod glabrous or grey-downy, generally much constricted between the seeds, 1–2 dm. l., 1–1·5 cm. br.—*Nees Pl. Medic. t. 332.* A. altera



Fig. 43.—*Acacia farnesiana* Willd.

Flower with calyx and corolla partly re moved $\times 7$.

vera &c. *Pluk.* *Phyt.* t. 251, f. 1 & *Alm.* 3. *A. arabica* Willd. *Sp. Pl.* iv. 1085 (1806); *Hayne Arzneyk.* x. t. 32; *Nees Pl. Medic.* t. 333; *Wils.* in *Reports Geolog. Jam.* 277; *Griseb. loc. cit.*: *Benth.* in *Trans. Linn. Soc. xxx.* 506. *A. vera* Willd. *loc. cit.* *Mimosa nilotica* L. *Sp. Pl.* 521 (1753). *M. arabica* Lam. *Encyc. i.* 19 (1783); *Roxb. Corom. Pl.* t. 149. Type in *Herb. Linn.*

Naturalized; *Masson!* *Wilson*; *Lucea*, *Hitchcock*.—Tropical Africa, extending to India.

A shrub or tree. *Pinnæ* 1·2-3 cm. l.; leaflets linear, blunt, petiole and rhachis puberulous, with several glands. *Calyx* 1·2-1·5 mm. l. *Corolla* twice as long as calyx. *Pod* scarcely splitting open, straight, flat or slightly convex over the seeds.]

§ 2. Shrubs or trees; stipules not spiny; prickles small, in pairs below the stipules, or scattered. Flowers in spikes or globular heads; peduncles axillary, or paniculate at the end of branches.

[*A. suma* *Kurz ex Brandis For. Fl.* 187 (1874); tree; prickles small, in pairs below the stipules; flowers in spikes; pod glabrous, net-veined.—*Benth.* in *Trans. Linn. Soc. xxx.* 519. *A. catechu* *Benth.* in *Hook. Lond. Journ. i.* 510 (1842); *Macf. Jam. i.* 314; *Griseb. Fl. Br. W. Ind.* 220, and most authors (non Willd.).

Naturalized; *Sloane Herb. vi.* 49*! *Lane* in *Herb. Sloane clxii.* 267! *Wilson*; *March*; Constant Spring, 600 ft.; Chancery Hall, 400 ft.; *Campbell!* Constant Spring; foot of Red Hills, St. Andrew; *Harris!* *Fl. Jam.* 6140, 6479, 8790, 11,834.—Native of tropical Asia and Africa.

Tree 15 to 20 ft. high; bark white or grey; twigs, petioles and inflorescence velvety. *Pinnæ* in 10-40 pairs, 2-6 cm. l.; leaflets in 30-50 pairs, linear, somewhat acute, 3-7 mm. l. Large elliptical gland on petiole, and smaller ones at the base of some of the pairs of pinnæ. *Spikes* 7-10 cm. l. *Flowers* white, changing to pale yellow. *Calyx* 2 mm. l., densely pubescent. *Corolla* 3(-4) mm. l. *Pod* 7-12 cm. l., 1·3-1·8 cm. br.

This species has been generally known as *A. catechu* Willd. by authors including *Bentham* (1842), but the latter botanist has, in his monograph on the *Mimoseæ*, correctly assigned the name *A. catechu* to the species with fewer leaflets (20-30 pairs), the corolla 2-3 times as long as the calyx, and the bark brown. Both species yield cutch.

Cutch or Catechu is prepared by boiling down a decoction of chips of the heart-wood, and is especially valuable as an astringent in chronic diarrhoea and dysentery. The wood seasons well, takes a fine polish, and is extremely durable. It is not attacked by white ants or toredo. It is used in India for oil and sugar-cane crushers, agricultural implements, and wheelwrights' work. A cubic foot weighs about 70 lbs. (Watt.)]

3. *A. riparia* *H. B. & K. Nov. Gen. & Sp. vi.* 276 (1824); shrub or tree, with branches climbing into higher trees; prickles scattered; flowers in globular heads; pod velvety, glaucous.—*Benth.* in *Trans. Linn. Soc. xxx.* 528 & in *Fl. Bras. xv. pt. 2,* 403; *Urb. Symb. Ant. iv.* 266. *A. sarmentosa* *Griseb. Pl. Carib.* 64 (1857) & *Fl. Br. W. Ind.* 221 (non *Desr.*); *Wils.* in *Reports Geolog. Jam.* 277.

Wullschaegel.—Hispaniola, Porto Rico, St. Thomas, St. Cruz, St. Martin, St. Bartholomew, Antigua, Guadeloupe, Martinique, St. Vincent, Grenada, Trinidad, Mexico, tropical S. America.

Shrub 6 to 25 ft., or tree to 50 ft. *Pinnæ* in 6-12 pairs, 3-7 cm. l.; leaflets in 15-40 pairs, oblong-linear, 5-9 mm. l. *Flower-heads* in wide-spreading panicles. *Flowers* white. *Calyx* minute, just over 1 mm. l. *Corolla* 2·2-2·5 mm. l. *Pod* 8-15 cm. l., 1·5-2·5 cm. br.

[*A. rugata* *Buch.-Ham.* *MS. in Wall. Cat. n.* 5251 (nomen) : trailing shrub, climbing to a height of 20 to 30 ft.; prickles numerous, scattered; flowers in globular heads; pod thick, fleshy, generally constricted between the seeds and breaking at the joints, the valves only splitting open after some time.—*A. concinna* *DC. Prodr. ii.* 464 (1825); *Benth. in Trans. Linn. Soc. xxx.* 531. *Mimosa rugata* *Lam. Encyc. i.* 20 (1783). *M. concinna* *Willd. Sp. Pl. iv.* 1039 (1805).

Naturalized; Gordon Town, 900 ft., J.P. 1133, *Hart!* also *Harris!* *Fl. Jam.* 8253.—Native of India and the Malay Archipelago.

Pinnæ in 4-8 pairs, 5-8 cm. l.; leaflets, 12-30 pairs, oblong or linear, unequal-sided, very oblique at the base, obtuse, 7-14 mm. l. *Peduncles* clustered 2-5 together, forming, on the fall of the leaves, a subpaniculate raceme. *Calyx* 3 mm. l. *Corolla* 4 mm. l. *Pod* to 13 cm. l., 1·5-2 cm. br.]

§ 3. Shrubs, without spines or prickles, erect, usually hairy. Flowers in short spikes or oblong heads, 2 or 3 together in the upper axils, becoming paniculate at the ends of branches. Flowers stalked. Pod flat, valves thin, with rib-like margins.

4. *A. villosa* *Willd. Sp. Pl.* 1067 (1806); *Macf. Jam. i.* 319; *Griseb. Fl. Br. W. Ind.* 221; *Benth. in Trans. Linn. Soc. xxx.* 532. *A. non spinosa latiore folio villosa &c.* *Houstoun MSS.* 23. *A. lophanthoides* *DC. Prodr. ii.* 457 (1825); *Macf. Jam. i.* 314. *Mimosa villosa* *Sw. Fl. Ind. Occ.* 982 (1800). The specimen named *M. arborea* in *Herb. Linn.* belongs to this species. Type (Houstoun's specimen) in *Herb. Mus. Brit.*

Houstoun! *Wright!* *Browne!* *Liguanea hills, Broughton!* common, low hills on the south side, *Macfadyen!* *Negro River, Purdie!* *Morant Bay, Oersted!* *Wilson!* *Prior!* *March!* King's House grounds, J.P. 1318, 1350, *Fawcett!* *Billy Dunn Pen, Liguanea,* 500 ft., *Campbell!* Hope grounds, 700 ft., *Harris!*—Central America.

Shrubby tree, 6-12 ft. high, villose or rarely glabrous. *Pinnæ* in 5 or 6 (4-10) pairs, 3-6 cm. l.; leaflets in 10-16(-30) pairs, elliptical-oblong, unequal-sided, apex obtuse or somewhat acute, base rounded, 4-8 mm. l.; petiole without a gland; stipules lanceolate, deciduous. *Calyx* minute, .7 mm. l. *Corolla* 2·2-2·5 mm. l. *Pod* 3·5-4·5 cm. l., 8-10 mm. br.

A. latisiliqua *Willd. Sp. Pl. iv.* 1067 (1806) is stated by *Macfadyen* (*Jam. i.* 318) to be "commonly cultivated in towns." *Urban* (*Symb. Ant. ii.* 265) suggests that it is identical with *Lysiloma bahamensis* *Benth.*, a species found in Florida Keys, Bahamas, Cuba, and Yucatan.

§ 21. Parts of the flowers in 5's. Stamens usually numerous, sometimes few, united at the base or into a tube. Anthers small. Pollen granules in 2–6 masses in each cell.

45. CALLIANDRA Benth.

Shrubs or small trees, without spines or prickles (except in *C. hæmatomma*). Petiolar glands wanting, but glandular depressions present at base of pinnæ in *C. comosa*. Flower-heads globose, on peduncles, 1–3 together in axils, or in corymbose racemes; flowers polygamous; floral parts in 5's. Calyx campanulate, toothed. Stamens numerous–10, united below, long exserted; pollen aggregated into 2 or 4 masses in each cell. Pod flat-compressed, usually with thickened margins, 2-valved, continuous within; valves elastically revolute from the apex to the base.

Species 100, natives of tropical and subtropical America, and one of India.

Flower-heads axillary.

- | | |
|---|------------------------------|
| Pinnæ in 2–4 pairs..... | <i>1. C. portoricensis</i> . |
| Pinnæ in 1 pair..... | <i>2. C. hæmatomma</i> . |
| Flower-heads in a raceme; racemes terminal,
corymbose..... | <i>3. C. comosa</i> . |

1. *C. portoricensis* Benth. in *Hook. Lond. Journ. iii.* 99 (1844); without spines or prickles; pinnæ in 2–4(–5) pairs; leaflets in 20–25 (10–) pairs; peduncles of flower-heads axillary, generally 3 together.—*Griseb. Fl. Br. W. Ind.* 224; *Benth. in Fl. Bras. xi. pt. 2, 411 & Trans. Linn. Soc. xxx.* 543; *Urb. Symb. Ant.* iv. 265. *Mimosa arborea non spinosa foliis &c. Sloane Cat.* 152 & *Hist. ii. 57.* *M. portoricensis Jacq. Collect. iv.* 143 (1790) & *Ic. Pl. Rar. iii. 20, t. 633.* *Acacia ungulata Desv. Journ. Bot. iii.* 68 (1814); *Ham. Prodr.* 59. *A. linearis Desv. ex Ham. Prodr.* 59 (1825). *A. Hamiltonii Desv. loc. cit.* *A. vespertina Macf. Jam. i.* 318 (1837). *Lysiloma Marchiana Griseb. op. cit.* 223 (1860). (Fig. 44.)

Night-flowering Acacia.

In fl. Feb.–Sept.; Red Hills, *Sloane Herb.* vi. 40b, 43, 46*! *Houstoun!* *Shakspear!* *Tate* in *Herb. Sloane clxii.* 266! *Liguanean Mts., Broughton!* common in Port Royal and St. Andrew Mts., *Macfadyen!* *Hartweg!* *Wilson!* *Moneague, Prior!* *March!* *Cinchona, J.P.* 1316, *Hart!* Blue Mts., *Hitchcock!* *Cherry Garden, 600 ft., Campbell!* *Holly Mount, 2600 ft., Harris!* *Fl. Jam.* 5712, 8904.—Bahamas, Cuba, Hispaniola, Porto Rico, Vieque, St. Jan, Grenada, tropical continental America, western tropical Africa.

Shrub or tree, 9–20 ft. high. Pinnæ 3–10 cm. l., leaflets linear-oblong or linear, apex obtuse, base truncate, sometimes almost auriculate, 6–15 mm. l.; gland wanting; stipules lanceolate, deciduous. Peduncles 3–6 cm. l. Flowers sessile, white, fragrant, about 15 in the head. Calyx 2 mm. l.,

teeth about $\frac{1}{3}$ of its length. Corolla 5 mm. l. Stamens numerous, 2-2.5 cm. l., shortly united at the base. Pod glabrous or slightly puberulous, 5-10 cm. l., 5-8 mm. br., 6-13-seeded, margins thickened; valves thin, chartaceous, when ripe rolling back spirally from the apex.

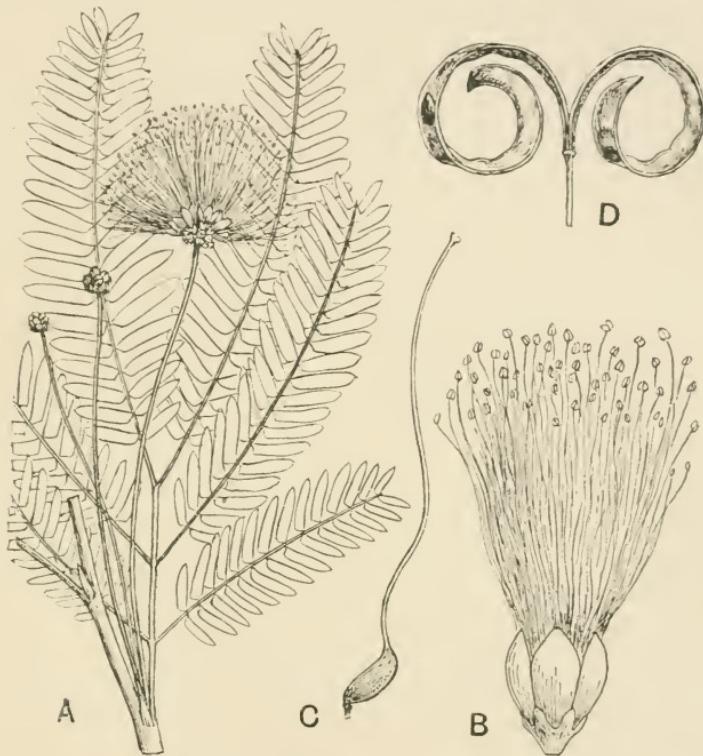


Fig. 44.—*Calliandra portoricensis* Benth.

A, Leaf and inflorescence $\times \frac{2}{3}$.
B, Flower $\times 2$.

C, Pistil $\times 4$.
D, Pod after opening $\times \frac{3}{2}$.

2. C. *hæmatomma* Benth. in *Hook. Loud. Journ. Bot.* iii. 103 (1844); stipular spines straight; pinnæ in 1 pair; leaflets in 4-8 pairs; peduncles of flower-heads axillary, solitary or rarely 2 together.—Benth. in *Trans. Linn. Soc.* xxx. 545. *C. hæmatomma* var. *glabrata* Griseb. *op. cit.* 224; *Urb. Symb. Ant.* ii. 263 & iv. 265 (under *C. hæmatostoma*). *Acacia hæmatomma* Bert. ex DC. *Mém. Lég.* 448, t. 68 (1825) & *Spreng. Syst.* iii. 137 (under *hæmatostoma*). *Acacia americana* siliquis teretibus &c. *Sloane Cat.* 152 & *Hist.* ii. 56 (in part).

Sloane Herb. vi. 43*2! *Broughton!* *Shakspear!* *Masson!* *Wilson!* *March!* road to Wareka, Long Mountain, 600 ft.; Great Goat Is., *Harris!* Fl. Jam. 8921, 9318.—Bahamas, Cuba, Hispaniola, Porto Rico, St. Thomas.

A slender-stemmed straggling bush, trailing over shrubs or trees, or a low spreading tree up to 12 ft. high. Pinnæ 5-1.5 cm. l.; leaflets

oblong, obtuse, unequal-sided, base rounded, 4-7 mm. l.; gland wanting. Peduncles 1.5-2 cm. l. Calyx 2 mm. l. Corolla 5 mm. l. Pod silky-velvety, narrowing gradually to the base, 4-6 cm. l.

"*Acacia pilosa* DC. Prodr. ii. 455, Spreng. Syst. iii. 136 & Macf. Jam. i. 313, is described from Bertero's Jamaican specimens without flowers or fruit, which are probably luxuriant barren branches of *C. hæmatomma*, with 10 to 13 pairs of leaflets to the pinnae" (Bentham).

3. *C. comosa* Benth. in *Hook. Lond. Journ.* v. 104 (1846); without spines or prickles; pinnae in 3-2 pairs; leaflets in 8-10 pairs; peduncles of flower-heads in a raceme; racemes terminal, corymbose.—*Griseb. op. cit.* 225; *Benth. in Trans. Linn. Soc.* xxx. 551. *Mimosa fruticosa* erecta inermis, cortice cinereo, floribus laxe conglobatis, spicis plurimis comosis terminalibus, foliolis minimis bipinnatis *Browne Hist. Jam.* 253. *M. comosa* Sw. *Prodr.* 85 (1788) & *Fl. Ind. Occ.* 980. *Inga comosa* Willd. *Sp. Pl. iv.* 1026 (1806); Macf. *Jam. i.* 307. *Pithecolobium?* *comosum* Benth. in *Hook. Lond. Journ. iii.* 221 (1844).

Browne; somewhat rare, on rocks in the mountains of the north side, *Swartz! Wilson*.

A shrub or small tree, 7-20 ft.; stem weak, branching at the very top; branches subdivided, slender, straight, erect; without spines or prickles, glabrous. Pinnae 4-5(-7) cm. l., with a glandular depression at the base of each. Leaflets sessile, broadly oblong, slightly tapering to the oblique obtuse apex, base broadly truncate, glabrous, veins prominent on both faces, shining on the upper, 10-12 mm. l., 4-6 mm. br. Flowers sessile, 4-8 together in heads; peduncles 5-10 mm. l.; racemes 2.5 cm. l. Calyx 1.2-1.5 mm. l.; teeth short, obtuse, 3-5. Corolla white (in bud), 4.5 mm. l.; petals 3-5 (fide Sw.). Stamens (fide Sw.) 20-40, white. Pod sickle-shaped, 5-7 cm. l., minutely puberulous, 3-8-seeded.

Browne states: "This shrub resembles the wild Tamarind, both in its foliage and colour; but it is never observed to rise above seven or eight feet in height, rarely so much. The disposition of the flowers distinguishes it sufficiently from any of the rest."

46. ALBIZZIA Durazz.

Trees or shrubs without spines or prickles. Flower-heads pedunculate or subsessile; peduncles clustered or racemose-paniculate. Floral parts in 5's. Calyx campanulate or tubular, toothed or shortly lobed. Corolla tubular or funnel-shaped. Stamens indefinite, long exserted, united below; anthers small, aggregated into 2-4 masses in each cell. Pod broadly linear, straight or somewhat curved, not twisted, flat-compressed, thin, not splitting open or 2-valved, continuous within, not pulpy. Seeds roundish, compressed, attached by a long slender stalk.

Species about 100, natives of tropical and subtropical regions.

[Pinnae in 2-4 pairs. Leaflets 1.5-5 cm. l. *A. lebbeck*.]
Pinnae in 7-15 pairs. Leaflets small; .5-1 cm. l.

[Peduncles clustered *A. julibrissin*.]
Peduncles racemose *A. Berteriana*.

[**A. lebbeck** Benth. in *Hook. Lond. Journ. Bot.* iii. 87 (1844); pinnae in 2–4 pairs; leaflets obliquely oblong, 1·5–4 or 5 cm. l., 1·5–2 cm. br., in 4–9 pairs; flowers shortly stalked in heads with long peduncles clustered 2–4 together; pod oblong, straight, swollen at the seeds, glabrous, ultimately opening.—Benth. in *Fl. Bras.* xv. pt. 2, 428 & in *Trans. Linn. Soc. x.c.* 562; Watt *Econ. Prod.* i. 156; Urb. *Symb. Ant.* iv. 264; Willd. *Sp. Pl.* iv. 1066 (1806); *Tussac Fl. Ant.* iv. t. 29; Macf. *Jam.* i. 318; Griseb. *Fl. Br. W. Ind.* 223. *Mimosa Lebbeck L. Sp. Pl.* 516 (1753). *M. speciosa* Jacq. *Ic. Pl. Rar.* i. 19, t. 198. Type in Herb. Mus. Brit., also specimen from Jacquin.

Naturalized; *Distin!* Wilson; Prior; Harris!—Tropical and temperate Asia and Africa; introduced in the West Indies and South America.

Tree to 30 ft. high. *Pinnae* 5–2 dm. l.; leaflets large, unequal-sided, very obtuse, very oblique at the base, subsessile. *Gland* on the common petiole. *Peduncles* generally 2–4 together. *Flowers* shortly stalked. *Calyx* puberulous, 3–5 mm. l. *Corolla* white, 7–10 mm. l. *Stamens* greenish-yellow, 3 times as long as the corolla. *Pod* 1·5–3 dm. l., 2·5–5 cm. br.

The wood seasons, works, and polishes well, and is fairly durable. Used in India for furniture, sugar-cane crushers, oil-mills, canoes, house posts, building, and fuel (Watt).]

[**A. julibrissin** Durazz. in *Mag. Tosc.* iii. pt. 4, 11 (1772) ex F. Muell. in *Journ. Bot.* 1872, 7; pinnae in 7–11 pairs; leaflets oblong, straight on the upper margin, curved on the lower, mucronate, midrib close to margin, 9–11 mm. l., 2·5–3·5 mm. br., in 20–40 pairs; flowers sessile in heads with long peduncles clustered 2–4 together in the axils or subracemose at the ends of branches; pod oblong, straight, swollen at the seeds, sometimes slightly and irregularly constricted between the seeds, glabrous.—Oliv. *Fl. Trop. Afr.* ii. 356; Bak. in *Hook. f. Fl. Brit. Ind.* ii. 300; Benth. in *Trans. Linn. Soc.* xxx. 568. *Mimosa julibrissin* Scop. *Delic. Insub.* i. 18, t. 8 (1786). *Acacia mollis* Wall. *Pl. As. Rar.* ii. 76, t. 177 (1831) (pubescent var.). *A. julibrissin* Willd. *Sp. Pl.* iv. 1065 (1806); Griseb. *loc. cit.*; Wils. in *Reports Geolog. Jam.* 277.

Naturalized; Wilson!—Subtropical and temperate Asia, north-east tropical Africa; introduced into the Mediterranean region and many parts of America.

Tree. *Pinnae* 4–7 cm. l. *Gland* on the common petiole. *Calyx* more or less puberulous, 2–3 mm. l. *Corolla* 6–8 mm. l. *Stamens* rose-red, about 4 times as long as the corolla. *Pod* 10–15 cm. l., 1·7–2·5 cm. br.

The wood is used in India to make furniture (Watt).]

A. Berteriana comb. nov.; pinnae in 9–15 pairs, leaflets oblong-linear, 4–8 mm. l., in 30–40 pairs; flowers sessile in small heads; heads shortly stalked, racemose-paniculate; pod straight, minutely puberulous, not opening, with blunt margin.—*Pithecolobium Berterianum* Benth. in *Hook. Lond. Journ. Bot.* iii. 220 (1844); Walp. *Rep. v.* 620; Urb. *Symb. Ant.* ii. 261. *P. fragrans* Benth.

loc. cit. (1844) & in *Trans. Linn. Soc.* xxx. 592; *Walp. Rep.* v. 619. *Acacia Berteriana* *Balb. ex DC. Prodr.* ii. 470 (1825); *Griseb. Fl. Br. W. Ind.* 223. *Inga fragrans* *Mucf. Jam.* i. 309 (1837); *Walp. Rep.* i. 931.

Sloane *Herb.* vi. 40a! *Lane* in *Herb. Sloane* clxii. 267! below Mocha and Chesterfield Works, *Macfadyen!* Mount Lebanon, 2500 ft.; *Malvern*, 2200 ft.; coast between Portland Point and Rocky Point; *Harris!* *Fl. Jam.* 5895, 9654, 9946, 10,190.—Cuba, Hispaniola.

A spreading tree, 20–30 ft. high; twigs, petioles, and peduncles glabrous or minutely puberulous. Leaf 1–2·5 dm. l. Pinnæ 4–8 cm. l. Leaflets somewhat unequal-sided especially at the base, lighter-coloured beneath. Gland oblong above the base of the petiole, and a roundish one between the terminal pair (or pairs) of pinnæ, and also at the ends of the pinnæ. Flowers greenish or white, fragrant. Calyx 1·5 mm. l. Corolla twice as long as calyx. Stamens twice as long as the corolla. Pod 7–12 cm. l., 12–15 mm. br.; stalk 6–10 mm. l., about 10-seeded. Seeds flat, discoid, about 5 mm. in diam.

47. PITHECELLOBIUM Mart.

Shrubs or trees, with or without spines. Pinnæ in 1 or several pairs; leaflets in 1 or many pairs. Flowers generally in globular heads, or rarely spicate, or, in *P. Alexandri*, in a spike-like raceme, white, generally hermaphrodite; floral-parts usually in 5's. Calyx campanulate, shortly toothed. Corolla funnel-shaped. Stamens few or numerous, long exserted, united at the base or higher into a tube; anthers small, pollen usually aggregated into 2–4 masses in each cell. Pod compressed, curved and twisted, continuous within, valves opening.

Species about 60, dispersed through the tropics.

Pinnæ in 1 pair. Leaflets in 1 pair. Stipules spiny.

Inflorescence glabrous. Corolla 5–6 mm. l. 1. *P. unguis-cati*.

[Inflorescence white-tomentose. Corolla 2·5–3 mm. l. *P. dulce.*]

Pinnæ in more than 1 pair. Leaflets in more than 1 pair.

Flowers in globular heads 2. *P. arboreum*.

Flowers in spike-like racemes 3. *P. Alexandri*.

1. *P. unguis-cati* *Benth.* in *Hook. Lond. Journ. Bot.* iii. 200 (1844); glabrous, stipules spiny, straight, small or minute, sometimes wanting; pinnæ in one pair, leaflets in one pair; flowers sessile in heads; heads globular or shortly lengthened into a spike in axillary racemes or terminal panicles; pod slightly constricted between the seeds, continuous within, red outside and inside, spirally curved, sometimes of 2 or 3 circles, valves much twisted; seeds black with a white aril.—*Benth.* in *Trans. Linn. Soc.* xxx. 572; *Griseb. Fl. Br. W. Ind.* 226; *Sarg. Silv.* iii. 133, t. 145; *Urb. Symb. Ant.* iv. 263. *Acaciæ quodammodo accedens et Ceratiæ &c.* *Pluk. Phyt.* t. 1, f. 6. *Acacia arborea major spinosa &c.* *Sloane Cat.* 152 & *Hist.* ii. 56.

Mimosa unguis-cati L. Sp. Pl. 517 (1753); *Jacq. Hort. Schoenbr. iii. t. 392*; *Sw. Obs. Bot.* 389. *M. spinis in caule geminis, foliis bigeminis Plum. Pl. Amer. (Burm.) t. 4.* *M. fruticosa foliis ovatis &c. Browne Hist. Jam.* 252. *Inga unguis-cati Willd. Sp. Pl.* 1006 (1806); *Macf. Jam. i.* 306. *I. microphylla Humb. & Bonpl. ex Willd. Sp. Pl.* 1004 (1806). *Mimosa rosea Vahl Eclog. Am. iii. 33, t. 25* (1807). *M. guadalupensis Pers. Syn. ii. 262* (1807). *Inga forfex Kunth Mimos. 52, t. 16* (1820). *Pithecellobium guadalupense Chapm. Fl. S. U. States* 116 (1860). (Fig. 45.)

Black-bead shrub.

St. Jago de la Vega, *Sloane* Herb. vi. 45, 46! *Houston!* *Wright!* *Masson!* *Bancroft!* *Purdie;* *Macfadyen*; Falmouth, Miss A. Moulton Barrett! between Kingston and Salt Ponds, *Fawcett!* near Falmouth;

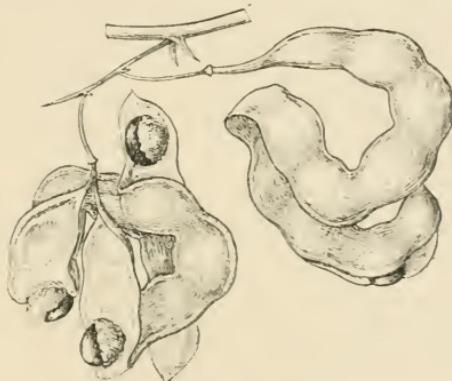


Fig. 45.—*Pithecellobium unguis-cati* Benth.

Pods, one just opening, the other quite open, showing the seeds with aril, nat. size.

Heathshire Hills; Corby, S. Cruz Mts., 1200 ft.; Salem, Llandovery, St. Ann; Harris! Fl. Jam. 7238, 9534, 9745, 10,376, 11,625.—Florida and Keys, Bahamas, West Indies, Venezuela, Colombia.

A glabrous shrub or small tree, 10–15 ft. high; common petiole 5–3·5 cm. l.; petiolule 3–8 mm. l. Leaflets obliquely obovate or elliptical, or oblong-lanceolate, varying much in size, 1–4·5 cm. l. and more. Gland between the pinnæ and between the leaflets. Flower-heads stalked, in axillary racemes, or terminal panicles. Calyx 1·5 mm. l. Corolla 5–6 mm. l., greenish-yellow. Stamens, 3 times as long as the corolla, pale yellow or sometimes rosy or purplish. Pod 7–10 mm. br. Seeds 5–7, black, shining, roundish, half covered with a white fleshy aril.

[*P. dulce* Benth. in *Hook. Lond. Journ. iii.* 199 (1844); like *P. unguis-cati*, but a tree to 50 ft. high: it also differs in the creamy-white corolla being only half as long, 2·5–3 mm. l., and the inflorescence, instead of being glabrous, is covered with whitish tomentum.—*Mimosa dulcis Roxb. Pl. Corom. i.* 67, t. 99 (1795). *Inga dulcis Willd. Sp. Pl. iv.* 1005 (1805); *Wight Iv.*

t. 198. An original specimen from Roxburgh in Herb. Mus. Brit.

Naturalized in Liguanea plain, *Harris!* Fl. Jam. 12,325, 12,336.—America and northern S. America, introduced into the rest of the tropics.]

2. *P. arboreum* Urb. *Symb. Ant.* ii. 259 (1900) & iv. 264; pinnæ in 8–16 pairs, leaflets in 20–30 pairs; flowers sessile in a globular head; peduncles 1–3 together in the axils or a short distance above; pod somewhat fleshy, continuous within, much constricted between the seeds, scarlet, curved or twisted; valves blood-coloured inside.—*P. filicifolium* Benth. in *Hook. Lond. Journ. Bot.* iii. 205 (1844) & in *Trans. Linn. Soc.* xxx. 589; *Griseb. op. cit.* 226. *Mimosa arborea* L. *Sp. Pl.* 519 (1753); *Sw. Obs. Bot.* 390. *Acacia arborea* Willd. *Sp. Pl.* iv. 1064 (1806) (excl. syn. *L. Sp. Pl.* 1503 & *Miller Dict.*); *Macf. Jam.* i. 320. *A. arborea* maxima &c. *Sloane Cat.* 151 & *Hist. ii.* 54, t. 182, f. 1, 2. *A. non spinosa jamaicensis* &c. *Pluk. Phyt.* t. 251, f. 2. *Mimosa arborea* cortice &c. *Browne Hist. Jam.* 252. *M. arborea* L. *Herb. & Sp. Pl. ed. 2,* 1503 (descr. only) is *Acacia villosa* Willd. Type in Herb. Mus. Brit.

Wild Tamarind.

Sloane Herb. vi. 41! *Barham* in *Herb. Sloane clxii.* 268! *Wright!* *Broughton!* *Swartz!* “common in the mountains,” *Macfadyen;* *Distin!* near Bath, *Purdie!* *Prior!* *March!* Lucea, *Hitchcock;* above Gordon Town, 1400 ft., *Harris!* near Hope, *Bot. Dept.!* Fl. Jam. 6791, 8294.—Cuba, Hispaniola, Porto Rico, Central America.

A spreading tree, 40–60 ft. high, 3–4 ft. in diam.; twigs, petioles, and peduncles rusty-pubescent. Common petiole 3–13 cm. l.; petiolule 3–10 cm. l. Leaflets oblong-lanceolate, glabrous, 6–9 mm. l. Glands petiolar and between each pair of pinnae. Peduncles 3–8 cm. l. Flowers whitish flesh-coloured. Calyx coloured, 2 mm. l. Corolla 6–7 mm. l. Stamens barely twice as long as corolla. Pod, when young, velvety, when older, glabrate, 7–12 cm. l., 8–12 mm. br. Seeds spherical or ellipsoidal, black, shining, 8–12 mm. l.

It saws freely, is not too hard for general work, is beautifully grained, takes a fine polish, and is in general use for floorings, ceilings, and ornamental work. Altogether it is an excellent timber, and very useful in building.

3. *P. Alexandri* Urb. *Symb. Ant.* v. 358 (1908) (incl. vars.); pinnæ in 3–9 (1–2) pairs, leaflets in 3–14 pairs; flowers stalked, in a spike-like raceme; pod subsessile, spirally twisted, slightly constricted between the seeds but continuous within, reticulate-veiny; valves on the inside yellowish, but red or brownish where the seeds occur.—*P. micradenium* *Griseb. Fl. Br. W. Ind.* 226 (1860) (in part); *Benth. in Trans. Linn. Soc.* xxx. 584 (in part). *P. Jupunba* Urb. var. *Alexandri* Urb. *Symb. Ant.* ii. 258 (1900).

Shag Bark, Shad Bark, Tamarind Shad Bark.

Wright! Moneague, *Prior!* Holly Mount, Mt. Diablo, 2500 ft.; Lapland, near Cataadupa, 1500 ft.; edge of Great Morass, Negril; near Troy, 1800–2500 ft.; Dolphin Head, 1200 ft.; Malvern to Mountain Side,

1200 ft.; Stanmore Hill, 2200 ft.; Kempshot, 1500 ft.; Harris! Fl. Jam. 8800, 8960, 8975, 9077, 9182, 9263, 9921, 9948, 10,243, 10,329.

Tree 30–40 ft. high. *Leaves* 7–12 cm. l. *Leaflets* unequal-sided, very variable in form and size, rhomboid or obliquely elliptical, 8–5 cm. l., 4–3·5 cm. br., with a close network of veins on both sides, glabrescent; *pinnae* 4–10 cm. l. *Glands* between each pair of *pinnae* and usually below each pair of leaflets. *Peduncles* 1 or 2 in the axes of leaves, 3–10 cm. l. *Racemes* 3–7 cm. l., densely or laxly flowered. *Flowers* pale yellow or greenish yellow, fragrant; *pedicels* 4–1 mm. l. *Calyx* 2–3 mm. l. *Corolla* about twice as long as the calyx. *Stamens* twice as long as corolla. *Seeds* white, with a horse-shoe-shaped greenish-blue mark opposite the attachment on each face, lens-shaped, almost round, about 7 mm. in diam.

48. ZYGIA P. Browne.

Trees without spines. *Pinnæ* in 1 pair; common petiole very short. Leaflets large, in 1–5 pairs. Glands between the *pinnae*,

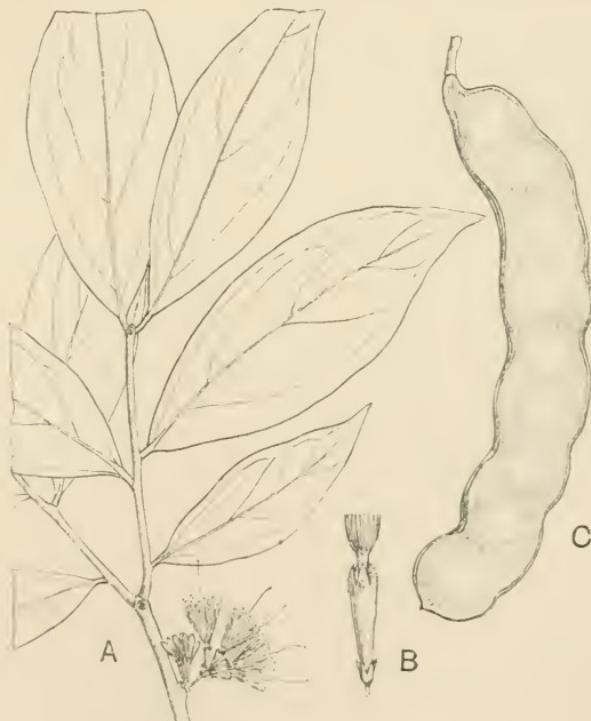


Fig. 46.—*Zygia latifolia* Fawc. & Rendle.

A. Leaf and inflorescence $\times \frac{1}{2}$. B. Flower with the stamens cut off above $\times 2$.
C. Pod $\times \frac{1}{2}$.

and between the leaflets. Flowers in heads or spikes at the nodes of branches which have dropped their leaves, similar to those of *Pithecellobium*; peduncles wanting or short, clustered.

Pod continuous within, flat-compressed, with the edges sometimes more or less undulate-curled, leathery and stiff, straight or curved, tardily opening.

Species about 14, natives of tropical continental America, one species also in the West Indies.

This genus is Bentham's section *Caulanthon* of *Pithecellobium*, with the exception probably of the last two species mentioned in his monograph in *Trans. Linn. Soc.* xxx. 593.

Z. latifolia comb. nov. *Zygia arborescens* &c. *Browne Hist. Jam.* 279, t. 22, f. 3. *Acacia non spinosa foliis juglandis flore purpureo* *Plum. Cat.* 17, *Ic. ined.* iv. 207 & *Pl. Amer. (Burm.)* 5, t. 9. *Mimosa latifolia* *L. Syst. ed.* 10, 1310 (1759). *M. Zygia* *L. Amoen. v.* 384 (1760). *Inga latifolia* *Willd. Sp. Pl.* iv. 1020 (1806). *Albizzia latifolia* *Boiv.* in *Encyc. xix. Siècle ii.* 33. *Pithecellobium latifolium* *Benth.* in *Hook. Lond. Journ. iii.* 214 (1844), in *Fl. Bras. xv. pt. 2,* 449, t. 119, & in *Trans. Linn. Soc.* xxx. 595. *Calliandra latifolia* *Griseb. Fl. Br. W. Ind.* 225 (1860). (Fig. 46.)

Horse Wood, Hoop Wood.

Very common, St. Mary, *Browne*; Agualta Vale river course, *McNab!* *Wilson!* Wag Water, St. Andrew, *March!* Mount Dakin; Castleton; *Harris!* *Fl. Jam.* 5610.—Martinique, St. Vincent, Trinidad, Panama, northern South America.

Shrub or tree, 10–25 ft. high, glabrous. Leaflets in 1 or 2 pairs with an odd leaflet below, the lower leaflets not opposite, elliptical, narrowing to the apex and to the oblique base, the highest 7–12(–15) cm. l., 2·5–5 cm. br., the lower on the pinna smaller. Stipules sometimes persistent, acute, 3–4 mm. l. Common petiole very short, 7–3 mm. l. or still shorter; rhachis of the pinnæ 2–12 cm. l. Gland between the pinnæ, and between the terminal leaflets. Flower-heads lax-flowered, subsessile or shortly stalked, densely clustered. Flowers crimson or purplish. Calyx campanulate, 1·5 mm. l. Corolla tubular, increasing in width upwards, toothed, 6–7 mm. l. Stamens more than twice as long as the corolla, tube exceeding the corolla in length by about 2 mm. Pistil nearly as long as the stamens. Pod curved slightly, 1–3 dm. l., 2–2·5 cm. br.

49. ENTEROLOBIUM Mart.

Trees, with or without spines. Pinnæ and leaflets in few or numerous pairs. Flowers sessile or shortly stalked, in globular heads. Peduncles axillary, solitary or in clusters of 2–5. Floral parts in 5's. Calyx campanulate to tubular, shortly toothed. Stamens indefinite, united below, exserted; pollen aggregated into 2–4 masses in each cell. Pod straight or curved, not twisted, thick, pulpy or more or less spongy and dry, or leathery, not or scarcely opening, with partitions between the seeds.

Species about 12, natives of tropical America.

The genus as amended here includes not only those species

given by Bentham in his monograph of Mimoseæ in *Trans. Linn. Soc.* xxx. 598, but probably most of the species of his section *Chloroleucon* of *Pithecellobium* and his *P. saman* Benth.

Pinnae in 4-10 pairs.

Leaf 8-17 cm. l. Pod broad, forming a circle 1. *E. cyclocarpum*.

Leaf 3-7 cm. l. Pod strap-shaped, curved 2. *E. mangense*.

[Pinnae in 2-4 pairs. Pod thick, fleshy, straight..... *E. saman*.]

1. *E. cyclocarpum* Griseb. *Fl. Br. W. Ind.* 226 (1860); without spines; pinnae in 4-9 pairs; leaflets small, in 20-30 pairs; flowers sessile in small heads; peduncles somewhat long; pod curved to form a complete circle, about 10 cm. in diam.—*Benth. in Trans. Linn. Soc.* xxx. 598. *Mimosa cyclocarpa* Jacq. *Fragm. t. 34, f. 1* (1800-1809). *Inga cyclocarpa* Willd. *Sp. Pl. iv.* 1026 (1806); *Macf. Jam. i.* 308. *Pithecellobium cyclocarpum* Mart. in *Flora xx. ii. Beibl.* 115 (1837) *in obs.*

Purdie! near Spanish Town bridge, Macfadyen! McNab; Castleton, Thompson! Ferry River, Harris! Fl. Jam. 7248, 10,383.—Central America, northern South America. Perhaps not distinct from *E. timbouva* Mart. from Brazil and Paraguay.

Tree 30-60 ft. high, subglabrous. Leaf 8-17 cm. l., pinna 4-10 cm. l. Leaflets oblong, slightly curved, 8-13 mm. l., unequal-sided as the midrib is submarginal, ending in an acute point, base truncate, glaucous beneath. Gland oblong, near base of petiole, and roundish-elliptical between the two uppermost pair of pinnae. Peduncles 3-5 in a cluster, axillary, 3-5-5 cm. l. Flowers greenish-yellowish. Calyx 2-2.5 mm. l. Corolla 4-5-5 mm. l. Stamens white, about twice as long as corolla.

2. *E. mangense* comb. nov.; spines 1 or 2, here and there, in a few of the leaf-axils, and especially in the axils of twigs; pinnae in 5-10 pairs; leaflets small, in 20-25 (10-30) pairs; flowers sessile in small heads; heads shortly stalked; pod flat, leathery, curved, somewhat thick, veiny, glabrous; valves opening.—*P. parvifolium* Benth. in *Hook. Lond. Journ. Bot.* iii. 223 (1884), in *Fl. Bras. xv. pt. 2*, 454 & in *Trans. Linn. Soc.* xxx. 597. *Mimosa mangensis* Jacq. *Enum. Pl. Carib.* 34 (1760), *Sel. Stirp. Amer.* 267, *Ed. pict. t. 262, f. 70*; *Sw. Prodr.* 85. *M. parvifolia* Sw. *Fl. Ind. Occ.* 984 (1800) (non *Poir.*). *Acacia parvifolia* Willd. *Sp. Pl. iv.* 1086 (1806); *Macf. Jam. i.* 315; *Griseb. op. cit.* 222. *Mimosa antillarum* Lam. ex *Poir. Encyc. Suppl. i.* 80 (1800). *Acacia micrantha* Desv. ex *Ham. Prodr.* 60 (1825). Specimen from Jacquin in *Herb. Mus. Brit.*

In fl. after rains in May and Oct.; near sea coast, Swartz! near Kingston, Macfadyen! St. Andrew. McNab! also March! Kingston, Campbell! Long Mountain road, 50 ft.; Harris! Fl. Jam. 6183, 9013, 9231.

A low tree, 10-15 ft. high; branches spreading; young twigs, petioles and inflorescence puberulous or glabrous. Leaf 3-7 cm. l.; pinna 1-3 (4) cm. l.; leaflets oblong-linear, 4-6 mm. l.; veins prominent beneath, one nerve between the midrib and the margin on the lower side of mature leaflets. Glands above the base of the common petiole and between the

highest pair of pinnæ. *Peduncles* about 1 cm. l. *Flowers* pale greenish, slightly fragrant. *Calyx* 3-3·5 mm. l. *Corolla* 5 mm. l. *Stamens* indefinite; staminal tube about half as long as the corolla. *Pod* 1 dm. or more l., 10-12 mm. br.

[*E. saman* *Prain* in *Journ. As. Soc. Beng. lxi.* 252 (1897); without spines; pinnæ in 2-4 pairs; leaflets large, in 3-8 pairs; flowers shortly stalked, in large heads, peduncles somewhat long; pod thick, fleshy, straight, slightly flattened, often thicker than broad when quite ripe, not opening, with partitions between the seeds.—*Mimosa saman* *Jacq. Fragm.* 15, t. 9 (1800-1809). *Inga saman* *Willd. Sp. Pl.* iv. 1024 (1806); *Macf. Jam.* i. 307. *Pithecolobium saman* *Benth. in Hook. Lond. Journ. Bot.* iii. 216 (1844), *in Fl. Bras.* xv. pt. 2, 441 & *in Trans. Linn. Soc.* xxx. 587; *Urb. Symb. Ant.* iv. 264. *Calliandra saman* *Griseb. op. cit.* 225 (1860). *Albizia saman* *F. Muell. Sel. Pl. Indust. Cult.* 12 (1876). *Samanea saman* *Merrill* in *Journ. Wash. Acad. Sc.* vi. 47 (1916).

Guang o.

Naturalized; Salt Ponds, Macfadyen; Spanish Town; Moneague; *Prior!* Porus, *Lloyd*; Lucea, *Hitchcock*; Hope, *Harris!* Fl. Jam. 9276.—Naturalized or cultivated throughout the West Indies; native of Central and S. America.

A spreading tree, 40 ft. high; twigs, petioles, and peduncles pubescent. Common petiole and rhachis of leaf 10-15 cm. l.; rhachis of pinnæ 3-12 cm. l. Leaflets at the apex of leaf in 6-8 pairs, gradually fewer to the base, obovate or oblong or obliquely rhomboid, apex blunt or rounded, the largest at the apex of the pinnæ, 4·5 cm. l., gradually smaller towards the base, to 1·5 cm. l., pubescent beneath. Glands between the pinnæ and between the leaflets. Peduncles 5-9 cm. l. Calyx 6 mm. l. Corolla nearly twice as long, yellowish. Stamens numerous, 3 times as long as the corolla, light crimson. Pod 1·5-2·5 dm. l., 1·5-2 cm. br. Seeds to 25, separated from each other, and enclosed by a skin-like tissue, outside which is pulp.

The wood is hard and ornamental, but cross-grained and difficult to saw. The pods are eaten by cattle, and the tree is spread by means of the seeds in the droppings. The species is said to have been introduced by this natural means with cattle from the mainland. The tree is most useful in pastures, not alone for fodder, but for the shade it affords.]

49. INGA Willd.

Unarmed trees or shrubs. Leaves abruptly pinnate, leaflets in few pairs, large. Flowers large, in spikes or racemes. Floral parts in 5's. Calyx tubular or campanulate, toothed or shortly lobed. Corolla tubular or funnel-shaped. Stamens numerous, long exserted, united below into a tube; tube nearly as long as, or sometimes longer than, the corolla; pollen aggregated into 2 or 4 masses. Pod not opening or irregularly bursting, thickish, enlarged on the margins, 4-angled; seeds enclosed in pulp.

Species 140, natives of tropical America and of subtropical South America.

I. vera *Willd. Sp. Pl.* iv. 1010 (1806); *Macf. Jam.* i. 306; *Griseb. Fl. Br. W. Ind.* 228; *Benth. in Fl. Bras.* xv. pt. 2, 494 &

in Trans. Linn. Soc. xx. 627; Urb. Symb. Ant. iv. 263. Arbor siliquosa brasiliensis &c. Sloane Cat. 153 & Hist. ii. 58, t. 183, f. 1. Mimosa inga L. Sp. Pl. 516 (1753); Sw. Obs. Bot. 388. M. foliis pinnatis &c. Plum. Pl. Amer. (Burm.) t. 25. (Fig. 47.)

Banks of Rio Nuevo, Sloane Herb. vi. 51! Wright! Broughton! St. Ann, Purdie! Oersted! Wilson! March! Elmwood, Hart! Priestmans River, Deans! Castleton, Thompson! Port Morant, Hitchcock; Spring, St. Thomas; Moore Park, Portland, 1500 ft.; New Ground, St. Ann; Harris! Fl. Jam.

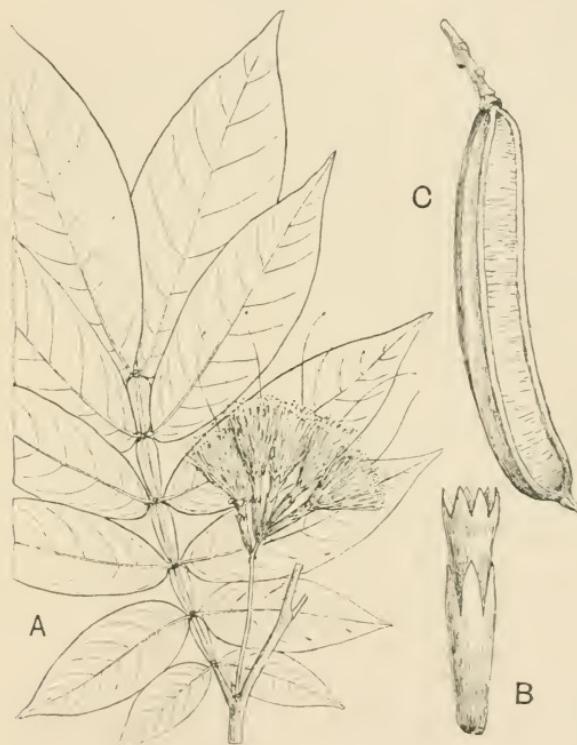


Fig. 47.—*Inga vera* Willd.

A. Leaf and inflorescence $\times \frac{1}{2}$. B. Calyx and corolla, nat. size.
C. Pod $\times \frac{1}{2}$.

5406, 6613, 8013, 10,364.—Hispaniola, Porto Rico, Trinidad, Central America, northern South America.

Tree 20–40 ft. high, tomentellous. Leaflets in 4–6 pairs, elliptical-oblong to lanceolate, sometimes obovate, usually acuminate, 4–13 cm. l. Petiole winged between the pairs. Gland circular, between the leaflets of each pair. Flowers sessile or subsessile, in spikes. Calyx 9–13 mm. l. Corolla white, 13–16 mm. l. Filaments white, more than twice as long as the corolla; tube shorter; anthers green. Pod 10–12(–15) cm. l., 12–20 mm. br., tomentose, slightly curved, 4-ribbed.

The specimen in Herb. Sloane corresponding to Sloane's description and figure cited by Linnaeus consists merely of the pod. We find no

indication of the regular dehiscence of the pod, nor of the terminal leaflet depicted by Sloane.

Grisebach cites Bentham as the authority for the occurrence of *I. ingoides* Willd. in Jamaica, but we find no confirmation of this, nor have we seen specimens. It differs from *I. vera* Willd. in the flowers being stalked, the spikes corymbose, calyx 6-7 mm. l., corolla twice as long as the calyx, and the pod longer and deeply furrowed.

FAMILY XL. GERANIACEÆ.

Herbs or shrubs; branches swollen at the nodes. Leaves simple, stipulate. Sepals and petals 5, generally distinct and imbricate. Stamens 10 or 15 (5), often united at the base. Ovary 5-celled; carpels united with the axis, produced above into a beak with the styles more or less combined with it. Fruit a capsule separating elastically into 5 one-seeded parts (coccii). Endosperm thin or none.

Species about 630, natives of temperate and subtropical regions of the whole world, a few in the mountains of the tropics.

GERANIUM L.

Herbs. Leaves palmately lobed. Flowers regular, parts in 5's. Glands 5, alternate with petals. Stamens twice as many as petals. Ovary 5-celled; stigmas 5; ovules 2 in each cell. Ripe carpels separating from the central axis elastically usually from base to apex, and recurved. Cotyledons induplicate-plicate or convolute; radicle incumbent.

Species about 260, natives of the temperate regions of the whole world, only found in the tropics in the mountains.

G. carolinianum L. *Sp. Pl.* 682 (1753); *Hanks & Small in N. Amer. Fl.* xxv. 9; *Knuth in Engl. Pflanzenreich* iv. 129, 54. *G. columbinum carolinum* &c. *Dill. Elth.* t. 135. *G. lanuginosum* *Jacq. Hort. Schoenbr.* ii. 8, t. 140 (1797). *G. pyrenaicum* *Griseb. Fl. Br. W. Ind.* 132 (1859) (non *Burm. f.*) (see *Urb. Symb. Ant.* vi. 96); *Hanks & Small tom. cit.* 10 (with reference to Jamaica). (Fig. 48.) Type in *Herb. Gronovius* in *Herb. Mus. Brit.*; specimen named by *Linnæus* in *Herb. Linn.*

Near Coldspring, *Swartz!* *McNab!* Abbey Green, *Prior*; Cinchona, J.P. 947, 1398, *Hart!* Blue Mt. Peak, *Hitchcock*; Clydesdale; Cinchona, 5000 ft.; below Newcastle, 3800 ft.; Green Valley, St. Andrew, 2000 ft.; *Harris!* *Fl. Jam.* 8577, 11,939, 12,388.—Southern Canada, U. States, northern Mexico, Bermuda.

Annual or biennial, pubescent. Stem branching, erect or ascending, to 1½ ft. high. Leaves 3-6 cm. br., divided almost to the base into 5-7 segments; segments pinnately cleft into linear lobes; petioles long. Inflorescence with the peduncles and flowers somewhat crowded and

corymbose. *Pedicels* with glandular hairs. *Sepals* tipped with a long mucro (1-2 mm. l.), 5-7 mm. l., often even to 8 mm. l. in fruit. *Petals* white tinged with pink, barely as long as the sepals. *Beak of fruit*



Fig. 48.—*Geranium carolinianum* L.

A, Shoot bearing flower and fruit $\times \frac{2}{3}$. from the central column in both directions $\times 2$.
 B, Fruit with valves separating elastically
 C, Seed $\times 3$.

12-18 mm. l., pubescent, hairs generally spreading. *Valves* smooth, with shaggy hairs, separating partly from base to apex, and partly from apex to base. *Seeds* with finely reticulate markings.

FAMILY XLI. OXALIDACEÆ.

Herbs, shrubs, or trees. Leaves compound, alternate. Stipules free from the petiole, or not, or wanting. Sepals 5, imbricate. Petals 5, twisted in bud. Stamens 10, united at the base; filaments alternately unequal, 5 opposite the sepals longer. Ovary 5-celled; styles 5, distinct, with terminal capitate

stigmas; ovules in the inner angle of each cell, one to numerous. Fruit 5-celled, a capsule in *Oxalis*, or a fleshy berry in the cultivated *Averrhoa*. Seeds generally covered with an aril. Endosperm fleshy; embryo straight.

Species about 310, mostly in tropical and subtropical America, and in S. Africa, very few throughout the tropics, and also very few in the temperate regions.

OXALIS L.

Herbs. Leaves digitately 3-foliate (in W. Indian species); leaflets sensitive to light, drooping as the light disappears. Ovules numerous in Jamaican species. Fruit a capsule, opening loculicidally. Seeds covered by a white fleshy aril which bursts elastically when they are ripe, and by its contraction expels them; testa transversely ridged, or minutely tuberculate.

Species about 300, growing in tropical and subtropical America, and also in S. America beyond the tropics, and in South Africa, very few occurring elsewhere in the tropics or in temperate regions.

Flowers yellow, 1 or 2 on an axillary peduncle 1. *O. corniculata*.

Flowers rosy, several, corymbose or umbellate, on
peduncles springing from the ground 2. *O. corymbosa*.

1. ***O. corniculata* L. Sp. Pl. 435 (1753)**; stems decumbent or creeping, rooting at the nodes and giving off ascending branches; flowers yellow, 3, 2, or 1, on an axillary peduncle.—*Jacq. Oxal.* 10, t. 5; *Griseb. Fl. Br. W. Ind.* 133; *Prog. in Fl. Bras. xii. pt. 2*, 492; *Urb. Symb. Ant. iv.* 312. *O. caule* &c. *Browne Hist. Jam.* 231. *O. repens* *Thunb. Oxal.* 16 (1781); *Jacq. Oxal.* 31, t. 78, f. 1; *Robinson in Journ. Bot. xliv.* 387. *O. jamaicensis* *Macf. Jam. i.* 182 (1837). *Trifolium acetosum corniculatum* &c. *Sloane Cat.* 90 & *Hist. i.* 18. *Xanthoxalis corniculata* & *X. Langloisii* *Small in N. Amer. Fl. xxv.* 52 (1907). Type in *Herb. Linn.*; also a similar specimen in *Hort. Cliff.* in *Herb. Mus. Brit.*

Sorrel.

A common weed in provision grounds, coffee pieces, gardens, etc.; *Browne! Macfadyen*; St. Thomas in the Vale; St. Mary; *McNab!* J.P. 1222, *Hart! Bog Walk, Hitchcock*; Providence, 700 ft., *Thompson!* waste places, Castleton, 500 ft., *Harris!* Fl. Jam. 8059, 11,009, 12,335, 12,384.—All tropical and temperate regions.

Sloane collected this species in Madeira on his voyage to Jamaica, but not in Jamaica. See *Herb. iv. 25*.

A variable annual herb. Stems 5-3 dm. and more, pubescent or glabrescent. Leaflets broadly obovate, more or less pubescent, margin sometimes ciliate, 1-1.5 cm. br.; petioles pubescent or glabrescent, 2-4 cm. l. Stipules not free from the petiole, ciliate, 1.5-2 mm. l. Peduncles more or less as long as, or longer than, the petiole, puberulous

or glabrate. Pedicels 7-1·5 cm. l. Bracteoles at base of pedicels, 2-4 mm. l., linear-lanceolate. Sepals 2-4 mm. l., hairy. Petals 4-9 mm. l. Filaments glabrous. Capsule 9-17 mm. l., linear-oblong, puberulous-velvety, abruptly narrowed at the apex. Seeds transversely ridged, 1·3 mm. l., reddish-brown.

2. *O. corymbosa* DC. *Prodri. i.* 696 (1824); stemless, leaves and peduncles springing from a compound bulb; flowers rosy, corymbose or umbellate.—*Bak. Fl. Maur.* 37. *O. Martiana*

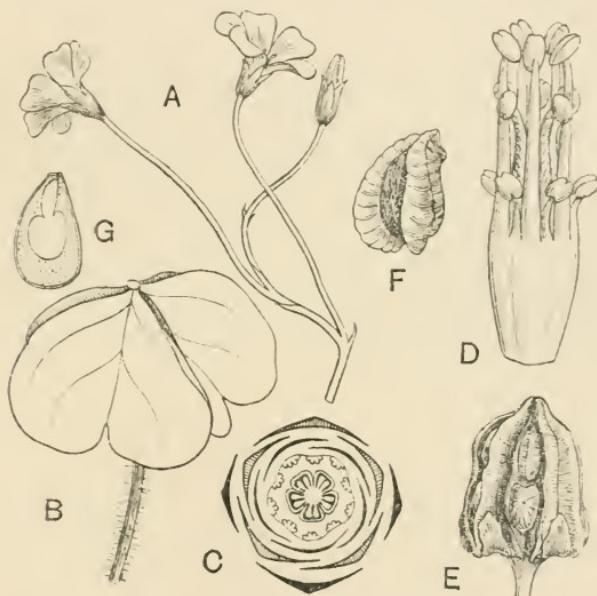


Fig. 49.—*Oxalis corymbosa* DC.

A, Portion of inflorescence $\times \frac{3}{4}$.
B, Leaf $\times \frac{3}{4}$.

D, Stamens and pistil $\times 6$.

C, Diagram of flower.
E, Ripe fruit, much enlarged.

O. Acetosella L.

F, Seed with aril, much enlarged.

G, Seed cut lengthwise, much enlarged.
(C, E-G, after Baillon.)

Zucc. in *Denkschr. Akad. Muensch.* ix. 144 (1825); *Bot. Mag.* t. 3938; Griseb. loc. cit.; Prog. tom. cit. 486. *O. bipunctata* R. Grah. in *Edinb. N. Phil. Journ.* (Apr.-June 1827) 176; *Bot. Mag.* t. 2781; Macf. *Jam. i.* 113. (Fig. 49 A, B, D.)

Kingston; Bog Walk; Hitchcock; near Castleton; Hope grounds; Harris! Fl. Jam. 6870, 12,334.—St. Vincent, Central America, tropical and subtropical S. America, introduced into many places in the Old World.

Stemless crown from which 20 or more leaves and several scapes arise, surrounded by numerous bulbils. Leaflets broadly obocordate, more or less pubescent and ciliate, glandular-dotted beneath, 1·5-3 cm. br.; petioles 1-2 dm. l. and more; stipules represented by expansions of the

petiole. *Scapes* longer than the leaves, many-flowered. *Pedicels* 5-2 cm. l. *Bracteoles* at base of pedicels. *Sepals* with 2 elongated glands at the apex, 4-5 mm. l. *Corolla* pink, turning violet in decay and in drying, 1-1.5 cm. l. *Stamens*: the longer pubescent. *Styles* densely hairy. *Capsule* (not seen) "oblong, many-seeded, downy" (Baker).

Averrhoa Carambola L. & *A. bilimbi* L., natives of tropical Asia, are sometimes cultivated.

FAMILY XLII. LINACEÆ.

Herbs or shrubs. Leaves alternate, simple, usually entire. Flowers perfect, regular, in racemes or in panicled or corymbose cymes. Parts of the flower in 5's. Sepals imbricate. Petals imbricate, generally twisted in bud, fugacious. Stamens generally 5, united below, hypogynous. Staminodal glands 5, on the staminal column. Ovary free, entire, 3-5-celled. Ovules 1 or 2 in the angle of each cell. Styles 3-5. Fruit capsular. Embryo generally straight and as long as the endosperm.

Species about 150; the herbaceous species natives chiefly of the temperate regions; the shrubby species principally in the tropics; very few in Australia.

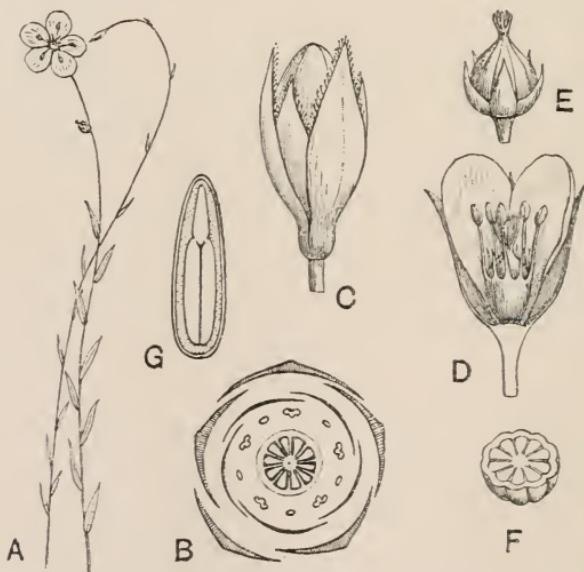


Fig. 50.—*Linum jamaicense* Fawc. & Rendle.

- A, Upper portion of stem $\times \frac{3}{2}$.
- B, Diagram of flower.
- C, Bud $\times 7$.
- D, Bud opened, with part of calyx and corolla removed, $\times 5$.
- E, Capsule enlarged.
- F, Ditto cut across.
- G, Seed of *L. usitatissimum* L.

(G, after Baillon.)

LINUM L.

Herbs, sometimes shrubby. Leaves sessile, narrow. Stipules wanting or represented by glands. Staminodal glands opposite the petals. Ovary generally 5-celled; ovules 2 in each cell; styles generally 5. Capsule septicidally 5-valved, 5-celled. Endosperm scanty.

Species about 90, natives of temperate and subtropical regions of the whole world, ascending to the mountains in the tropics of the New World.

L. jamaicense comb. nov.; *Cathartolinum jamaicense* Small in *Torreya* xiii. 63 (1913). (Fig. 50.)

Amongst grasses, in damp places, Crofts Hill to the savannas on the northern slopes of Bull Head, Clarendon, 2000 ft.; Hollis's savanna, Upper Clarendon, 2400 ft.; *Harris* Fl. Jam. 11,159, 12,243.

Perennial herbs, 9 ins. to 2 ft. high. Stem erect, slender, glabrous, generally simple. Leaves more or less erect, 6-12 mm. l., linear. Flowers in interrupted spike-like racemes. Sepals about 3 mm. l., outer lanceolate, without glands, inner narrowly elliptical, often minutely glandular-toothed. Petals yellow, 4·5-7·5 mm. l., very fugacious. Staminodia wanting. Capsule globular-ovoid, longer than the sepals.

FAMILY XLIII. ERYTHROXYLACEÆ.

Glabrous shrubs or trees. Leaves alternate, simple, entire. Flowers white, one to several, in axils of leaves, sometimes appearing before the leaves, regular, perfect but sometimes anthers or pistil infertile: parts in 5's. Calyx persistent; segments 5, imbricate. Petals 5, free, deciduous, generally with a ligule at the base. Stamens 10, filaments united below into a cup. Ovary 3-celled, with 1 or 2 pendulous ovules in each cell. Styles 3, usually with terminal capitate stigmas. Fruit drupaceous. Seed generally with endosperm; embryo straight.

Species nearly 200, natives of the West Indies and tropical and subtropical S. America, and Africa, very few in the East Indies and Australia.

ERYTHROXYLON L.

Stipule one, within the petiole, persistent, occurring frequently though the leaf is undeveloped, broadly triangular (lanceolate in *E. obovatum*), 2-ridged. Flowers often dimorphic, heterostyled. Calyx: segments triangular. Petal consisting of a blade and a claw, with a broad scale or ligule attached on the inside where the blade and claw unite. Ovary 3-celled with

2 cells abortive; ovule solitary. Styles 3, distinct or united at the base. Drupe red, with 1 seed.

Species nearly 200; distribution as in Family.

Leaves with central area beneath included between

2 longitudinal veins..... 1. *E. areolatum*.

Leaves without 2 longitudinal veins.

Pedicels slender throughout. Apex of leaves rounded.

Leaves roundish-obovate, 5-3·5 cm. l. 2. *E. rotundifolium*.

Leaves elliptical, 2·5-7 cm. l. 3. *E. obovatum*.

Pedicels thickened upwards.

Apex of leaves acute 4. *E. incrassatum*.

Apex of leaves rounded 5. *E. jamaicense*.

1. *E. areolatum* L. *Syst. ed.* 10, 1035 (1759) & *Aman. v.* 379, 397; leaves with central area on the under side enclosed between 2 longitudinal veins, commencing at the apex and more or less continued to the base.—*Sw. Obs. Bot.* 184; *Descourt. Fl.*

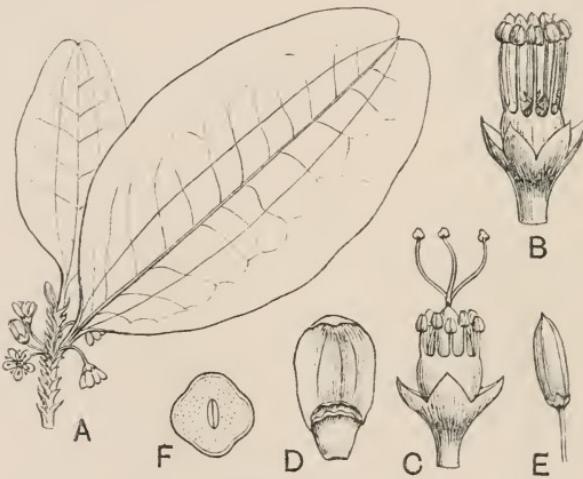


Fig. 51.—*Erythroxylon areolatum* L.

A, Upper part of twig with stipules, leaves and flowers $\times \frac{2}{3}$.

D, Petal $\times 5$.

B, Short-styled form of flower, petals removed $\times 4$.

E, Drupe, nat. size.

C, Long-styled form of ditto $\times 4$.

F, Ditto cut across $\times 2$.

(After O. E. Schulz, except D.)

Ant. vi. 260, t. 442; *Macf. Jam. i.* 144; *Griseb. Fl. Br. W. Ind.* 113 (excl. syn. and habitat); *O. E. Schulz in Urb. Symb. Ant. v.* 193 & in *Engl. Pflanzenreich iv. pt.* 134, 63, fig. 13; *Britton in N. Amer. Fl. xxv.* 63. (Fig. 51.) A specimen from Browne is in Herb. Linn. named in Solander's hand.

Red Wood.

Browne! Swartz! Macfadyen! Liguanea Plain, McNab! Oersted; near Manchioneal, Wilson! March! King's House grounds, J.P. 1346, Morris!

Grove, 750 ft.; road to Constitution Hill, 1500 ft.; Great Goat Is.; *Harris!* Fl. Jam. 5904, 6837, 9027, 9333.—Bahamas, Cuba, Hispaniola, Porto Rico.

Tree 10–20 ft. high. *Leaves* elliptical, narrowed to the base, apex rounded or slightly emarginate, 3–9(–13) cm. l.; petioles 3–6 mm. l. *Stipules* 2–2·5 mm. l., triangular, 2-ridged, 2-mucronulate. *Flowers* long- and short-styled, 2–6 in the axils, fragrant, appearing mostly before the leaves. *Pedicels* 2·5–7 mm. l. *Calyx* 1·5–2 mm. l.; segments ovate to lanceolate, 1–1·2 mm. l. *Petals* about 3 mm. l.; blade oblong-elliptical, concave, about 2 mm. l.; claw continuing evenly the outline of the blade, or somewhat narrower, ·7 or ·8 mm. l., ligule ·5–·8 mm. l., roundish, erect over the blade, with a double edge. *Drupes* oblong, 7–9 mm. l., orange-scarlet.

The leaves contain only a small amount of cocaine. The timber is small, but is useful for general purposes, as it saws readily.

2. *E. rotundifolium* *Lun. Hort. Jam. ii.* 116 (1814); leaves roundish-obovate, ·5–3·5 cm. l., apex rounded or emarginate; drupe 5–6 mm. l., ellipsoidal.—*Britton tom. cit. 61.* *E. foliis minoribus &c.* *Browne Hist. Jam.* 278. *E. obovatum* *Macf. Jam. i.* 143 (1837). *E. brevipes* *Griseb. loc. cit.* (non *DC.*). *E. suave O. E. Schulz in Urb. Symb. Ant. v.* 199 (1907) & in *Engl. Pflanzenreich iv. pt. 134*, 67 (as regards sp. and var. *jamaicense*).

Browne; *Wright!* *Macfadyen!* *Purdie!* *Prior!* *March!* *Robertsfield, J.P.* 1476, *Hart!* *Green Valley*; road to Wareka, 1200 ft.; near Troy, 2000 ft.; Long Mountain, 150–800 ft.; Cane River valley, 300 ft.; Peckham, 2500 ft.; *Harris!* Fl. Jam. 5613, 9387, 9422, 9576, 9602, 9629, 10,942.—Cuba, Hispaniola, Porto Rico.

Shrub or *tree*, 15–40 ft. high; trunk slender or over 1 ft. in diam. *Petioles* 2·5–4 mm. l. *Stipules* amplexicaul, triangular, 1–1·5 mm. l. *Flowers* 1–4 in the axils. *Pedicels* 1–5 mm. l. *Calyx* about 2 mm. l.; segments ovate to ovate-lanceolate, about 1 mm. l. *Petal*: blade elliptical, concave, keeled on the back, 1·1–1·8 mm. l.; claw oblong, narrowing towards base, 1·2 mm. l. and br.; ligule 1–1·3 mm. l., with 2 lobes over the lamina, erect or bending inwards, and another lobe over the claw, concave or flat, nearly as broad as the claw.

3. *E. obovatum* *Griseb. Fl. Br. W. Ind.* 113 (1859) (non *Macf.*); leaves elliptical, base wedge-shaped, apex rounded or very slightly emarginate, 2·5–5(–7) cm. l.; stipules lanceolate or linear-lanceolate; drupe oblong, 8–9 mm. l.—*O. E. Schulz in Urb. Symb. Ant. v.* 209 & in *Engl. Pflanzenreich iv. pt. 134*, 100; *Britton tom. cit. 64.* *E. affine A. Rich. in Sagra Cub. x.* 106, t. 27 (1845). *E. areolatum L. var. affine O. E. Schulz in Engl. Pflanzenreich iv. pt. 134*, 65 (1907). Specimens from Macfadyen in Herb. Kew. show that his *E. obovatum* was misinterpreted by Grisebach and subsequent authors.

March! *Malvern*, 2200 ft.; *Lititz savanna*, 300–900 ft.; *Constant Spring* to *Bardowie*, 800 ft.; *Harris!* Fl. Jam. 9661, 11,740, 12,105.—*Bahamas, Cuba.*

Tree 12–25 ft. high. *Petioles* 4–8 mm. l. *Stipules* 2–6 mm. l. *Flowers* 6 (1–10), in the axils. *Pedicels* 1–4 mm. l., slightly thickened above. *Calyx* about 2 mm. l.; segments 1 mm. l. *Petal*: blade elliptical, flat,

keeled on the back, about 2·7 mm. l.; claw 8 mm. l., 5 mm. br.; ligule about 1·2 mm. l., of 2 lateral concave lobes united from their backs, with the inner edge decurrent on the claw.

4. *E. incrassatum* *O. E. Schulz* in *Urb. Symb. Ant.* v. 210 (1907); leaves elliptical, base cuneate, apex acute or slightly and shortly acuminate, 8–10 cm. l.; 3·5–4·5 cm. br.; pedicels thickened upwards, passing gradually into the calyx.—*O. E. Schulz* in *Engl. Pflanzenreich* iv. pt. 134, 101. *E. havanense* *Sw. Obs. Bot.* 185 (1791) (non *Jacq.*). *E. squamatum* *Griseb. op. cit.* 114 (1859) (as regards the Jamaican plant) (non *Vahl*).

Swartz! Prior!

Petioles 6–8 mm. l. *Stipules* 1–1·5 mm. l. *Flowers* 1–3 in the axils. *Pedicels* 8–10 mm. l. *Calyx* about 1·5 mm. l.; segments about 1 mm. l. *Petals* obovate-oblong, 4–4·5 mm. l. (incl. claw up to 1 mm. l.); ligule 1·5–2 mm. l., 2 lobes on each side, the exterior lobes the longer, denticulate, with an obtuse lobe joining them on the outside, the interior lobes united by a lobe turned downwards on the inside. *Staminal tube* shorter than the calyx. *Drupe* unknown.

5. *E. jamaicense* *Fawc. & Rendle* in *Journ. Bot.* lv. 38 (1917); leaves elliptical, apex and base rounded, 4–7 cm. l., 2·5–4 cm. br.; pedicels thickened upwards, passing gradually into the calyx. Type in *Herb. Jam.*

Peckham Woods, Clarendon, 2,500 ft., *Harris! Fl. Jam.* 11,203.

Tree 15 ft. high. *Petioles* about 1 cm. l. *Stipules* 2–3 mm. l., persistent triangular-ovate, not keeled, apex erect, shortly aristate. *Flowers* 1–2 in the axils. *Pedicels* 3–4 mm. l. *Calyx* 1·5 mm. l.; segments slightly over 1 mm. l. *Petals* oblong, nearly 3 mm. l. (incl. claw 1·3 mm. l.); ligule folded just above the middle, upper portion reflexed, 2-lobed, the fold forming a crenulate pocket, length from union of claw and lamina to fold 1 mm. *Staminal tube* slightly shorter than the calyx. *Stigmas* capitate. *Drupe* linear-oblong, curved, 1·3 cm. l., 2–2·5 mm. br.

FAMILY XLIV. ZYGOPHYLLACEÆ.

Herbs, shrubs, or trees. Leaves opposite, or alternate by abortion of one of the pair, abruptly pinnate, stipulate; leaflets entire. Peduncles 1, or 2 together, or often more in *Guaiacum*, 1-flowered. Flowers hermaphrodite, sepals and petals usually 5, imbricate, distinct. Stamens generally 10, distinct. Ovary 2–12-celled; styles combined into one; ovules 2 to many, more rarely 1, pendulous or ascending, with ventral raphe and superior micropyle. Fruit composed of 2–12 cocci; cocci 1- or few-seeded. Endosperm horny, thick, scanty, or wanting. Embryo as long as the seed, green, straight; cotyledons oblong or linear, somewhat thick or leafy.

Species, about 160, natives of the tropical and warm regions,

chiefly of the northern hemisphere, very rare in tropical Africa, wanting in Further India and in the Malay Archipelago.

Trees. Fruit fleshy at first, angled or winged... 1. *Guaiacum*.

Herbs. Fruit dry.

Sepals deciduous. Fruit spiny..... 2. *Tribulus*.

Sepals persistent. Fruit tuberculate..... 3. *Kallstroemia*.

1. GUAIACUM L.

Trees or shrubs, with hard resinous wood; twigs often with swollen or jointed nodes. Leaves abruptly pinnate; leaflets leathery, in 2-14 pairs; stipules minute, caducous. Peduncles 1-flowered, solitary or 2 or more, with minute deciduous bracts at the base. Sepals unequal. Petals obovate. Ovary stalked, 2-(5) celled; ovules 8-10 in each cell, pendulous. Fruit somewhat fleshy on the outside, composed of 2(-5) cocci; cocci angled or winged on the back, separating at length, 1-seeded. Endosperm horny, with chinks; embryo straight; cotyledons leafy.

Species 4, natives of tropical and subtropical America.

G. officinale L. *Sp. Pl.* 381 (1753); *Tussac Fl. Ant.* iv. t. 35; *Descourt. Fl. Ant.* vii. t. 463; *Wright Mem.* 214; *Macf. Jam.* i. 187; *Bot. Reg.* xxv. t. 9; *Griseb. Fl. Br. W. Ind.* 134; *Berg & Schmidt Off. Gew.* ii. t. 14b; *Bentl. & Trim. Med. Pl.* t. 41; *Cook & Coll. in Contrib. U.S. Nat. Herb.* viii. 150; *Urb. Symb. Ant.* iv. 314; *Vail in N. Amer. Fl.* xxv. 105. *G. jamaicense* . . . flore albo and *G. jamaicense* . . . flore subcæruleo *Pluk. Phyt.* t. 35, f. 34. *G. flore &c. Plum. Nor. Pl. Amer. Gen.* 39. *Pruno vel euonymo affinis &c. Sloane Cat.* 186 & *Hist. ii.* 133, t. 222, f. 3-6. *G. foliis &c. Browne Hist. Jam.* 225. (Fig. 52.) Specimen from Hort. Cliff. in *Herb. Mus. Brit.*; and one from Browne in *Herb. Linn.* named by Linnaeus.

Lignum Vitæ.

Barham in *Herb. Sloane* clxxxiv. 164! *Sloane Herb.* vii. 78! *Browne!* *Broughton!* *Shakspear!* plains on the south side, *Macfadyen!* St. Andrew, *McNab!* *Parnell!* *Purdie!* Port Henderson, *Lane!* *Prior!* *March!* *Liguanea* plain, J.P. 616, *Morris!* Kingston, *Hitchcock*; also *Plaxton!* and *Clute!* Long Mountain road, *Campbell!* also *Harris!* *Fl. Jam.* 6411, 8639 (fls. white), 8640 (fls. blue).—West Indies, northern S. America.

Tree, usually not more than 12-15 ft. high, with diameter not often exceeding 1½ ft. *Leaflets* in 2(-3) pairs, sessile, elliptical to obovate-elliptical, rarely oblanceolate-elliptical, glabrous, nerves and veins prominent on both sides, 1·5-5 cm. l.; stipules puberulous, 1 mm. l. *Peduncles* few or often crowded, as many as 10 in a cluster, axillary, at ends of twigs, 1·5-3 cm. l. *Sepals* 5, white-tomentose inside and out, 4-5 mm. l., three outer broader and shorter than the rest. *Petals* 5, blue, rarely white, puberulous on the inside and sometimes on both sides at the apex, 12 mm. l. *Stamens* 10, 7-9 mm. l.; anthers recurved after shedding pollen. *Fruit* usually of 2 carpels, 1·5-2 cm. l. and br., yellow, compressed,

somewhat obcordate, with the base of the style persisting as a small point. Seed solitary in each cell, ellipsoidal, 12 mm. l., 8 mm. br.; seed-coat thick; embryo in the centre of the thick horny endosperm.

The wood is very fine, close, and even in grain; it is durable and tough, splitting with very great difficulty. It is excessively hard, equalling ebony in this respect. It is used for wheels and cogs for mills, pulley-blocks, pestles, rulers, policemen's batons, balls for bowls, &c. Weight

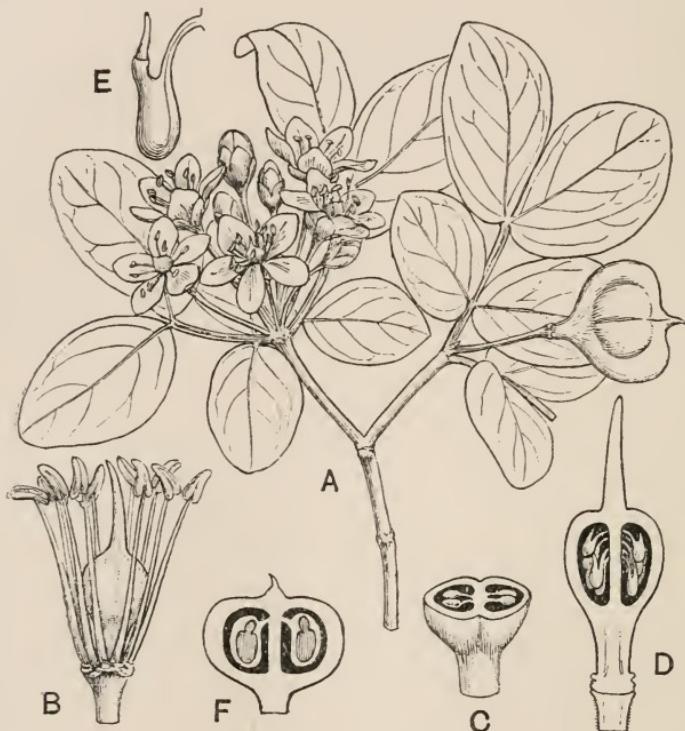


Fig. 52.—*Guaiacum officinale* L.

A, Leaves with inflorescence and one fruit $\times \frac{2}{3}$.

C, Ovary cut across $\times 4$.

B, Flower, with sepals and petals re-moved, $\times 3$.

D, Pistil cut lengthwise $\times 4$.

E, Ovule much enlarged.

F, Fruit cut lengthwise, nat. size.

(After Berg & Schmidt.)

72 to 83 lbs. per cubic foot. *Guaiacum* resin is obtained from the wood; "it is a useful remedy in chronic forms of rheumatism, in syphilitic and gouty affections, scrofula, skin diseases, &c." The wood possesses similar properties, but the action is milder, and it is only now used as an ingredient of the official compound decoction of Sarsaparilla (Bentley and Trimen).

2. TRIBULUS L.

Herbs with procumbent branches. Leaves abruptly pinnate, opposite, one of each pair alternately smaller than the other or sometimes wanting; stipules obliquely lanceolate. Flowers

solitary on axillary peduncles. Sepals lanceolate to ovate, soon falling. Petals obovate, deciduous. Stamens 10 in 2 series, the 5 opposite the petals exterior and usually a little longer, the 5 alternate with a small gland at the base outside. Ovary 5-lobed, 5-celled; each cell divided by transverse partitions into 3-5 compartments; ovules one in each compartment attached at the central angle. Fruit 5-coccus; cocci few-seeded, with 3-5 transverse compartments, at length separating, leaving no central axis, not splitting open. Embryo without endosperm.

Species 12, natives of tropical and subtropical regions of the whole world, including south Europe.

T. cistoides L. *Sp. Pl.* 387 (1753); *Descourt. Fl. Ant.* iv. t. 250; *Macf. Jam.* i. 185; *A. Gr. Gen. ii. t. 145*; *Griseb. Fl. Br.*

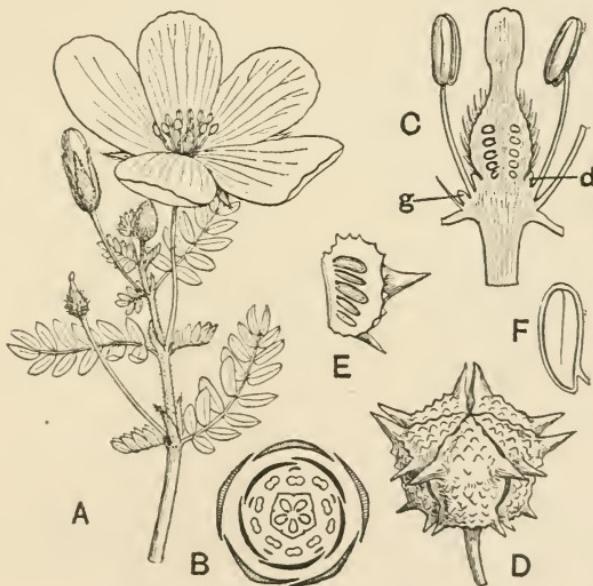


Fig. 53.—*Tribulus cistoides* L.

- A, Flowering branch with leaves $\times \frac{2}{3}$.
- B, Diagram of flower.
- C, Flower cut lengthwise, calyx and corolla removed, showing pistil with hypogynous disk (d), two stamens, and one staminal gland (g), $\times 4$.

- D, Fruit somewhat enlarged.
- E, Coccus cut lengthwise, somewhat enlarged.
- F, Seed cut lengthwise, enlarged.

(After A. Gray.)

W. Ind. 134; *Engl. in Fl. Bras.* xii. pt. 2, 69; *Vail & Rydb. in N. Amer. Fl.* xxv. 109. *T. terrestris americanus* &c. *Pluk. Phyt.* t. 67, f. 4. *T. foliis sex jugatis* &c. *Browne Hist. Jam.* 220. *T. terrestris* L. var. *cistoides* Oliv. *Fl. Trop. Afr.* i. 284 (1868);

Urb. Symb. Ant. iv. 315. (Fig. 53.) A specimen from Browne, named by Linnaeus, is in Herb. Linn.

Turkey Blossom.

Kingston and neighbourhood; in fl. after rains; *Browne!* *Wright!* *Broughton!* *Distin!* *Macfadyen!* *Parnell!* *Lane!* J.P. 714, *Jenman!* J.P. 2098, *Morris!* *Hitchcock!* Chelsea Pen, *Campbell!* near Kingston, *Clute!* also *Harris!* Fl. Jam. 6480, 11,967.—Florida, Bahamas, Cuba, Hispaniola, St. Cruz, Tortola, St. Martin, Guadeloupe, Marie Galante, Martinique, Margarita, tropics.

Stem to 1 ft. l. and more, more or less pubescent with white hairs, especially at the nodes. Leaves varying in size, 2·5-6 cm. l., with 3-9 pairs of leaflets; leaflets somewhat unequal in size, the larger in the middle of the leaf, 7-17 mm. l., 3-6 mm. br., unequal-sided, oblong, with silky adpressed hairs beneath. Stipules 4-9 mm. l. Flowers solitary; peduncle in the axil of the shorter leaf, and longer than it. Sepals 7-9 mm. l. Petals obovate-cuneate, yellow, with numerous veins straight below, branching above, generally 2-2·5 cm. l., up to 1·5 cm. br. near apex, sometimes smaller. Stamens 4-8 mm. l. Ovary hispid with white hairs. Fruit 6-9 mm. l.; cocci transversely 5-celled or by abortion 2-4-celled, with 2 horizontally spreading spines above, 4-5 mm. l., and 2 shorter at the base.

Browne says: "This plant, whether a native, or originally introduced to Jamaica, is now very common about Kingston. The fowls are observed to feed much on the blossoms of this plant, which is thought to heighten the flavour, as well as to contribute to the fattening of them."

3. KALLSTROEMIA Scop.

Herbs, very similar in habit to species of *Tribulus*; branches ascending or procumbent. Leaves abruptly pinnate, opposite, one of each pair alternately somewhat smaller than the other, or wanting; stipules linear-acuminate. Sepals persistent in the fruit. Petals obovate. Stamens 10, those opposite the petals more or less adhering to their base, the alternate stamens smaller, with a stalked gland at the base outside. Ovary 10-12-lobed, 10-12-celled; ovules one in each cell pendulous from the central angle. Fruit composed of 10-12 cocci; cocci tuberculate, 1-celled, 1-seeded, at length separating, leaving a long central axis, not splitting open. Seed without endosperm.

Species about 20, natives of tropical America.

K. maxima *Wight & Arn.* *Prodr.* 145 (1834); *Torr. & Gr.* *Fl. N. Amer.* i. 213 (1838); *A. Gr. Gen.* ii. t. 146; *Engl. in Fl. Bras.* xii. pt. 2, 71; *Rydb.* in *N. Amer. Fl.* xxv. 111. *Tribulus terrestris* major &c. *Sloane Cat.* 90 & *Hist.* i. 209, t. 132, f. 1. *Tribulus?* foliis senis &c. *Browne Hist.* *Jam.* 220, t. 21, f. 3. *T. maximus* *L.* *Sp. Pl.* 386 (1753); *Jacq. Ic. Pl. Rar.* t. 462; *Griseb. Fl. Br. W. Ind.* 134. *T. decolor* *Macf. Jam.* i. 186 (1837). (Fig. 54.) Specimen from Hort. Cliff. in Herb. Mus. Brit., and from Browne in Herb. Linn., the latter named by Linnaeus.

St. Jago de la Vega, and elsewhere, Sloane Herb. iv. 22! Browne! Broughton! Shaksppear! Distin! St. Mary, McNab! Prior; Gordon Town, Ball! Lucea, Hitchcock; Spanish Town road, Campbell! Hope grounds, Harris! Fl. Jam. 5687, 6298, 6634, 6638.

Stems and procumbent branches $\frac{1}{2}$ - $1\frac{1}{2}$ ft. long, more or less pubescent with white hairs, especially at the nodes. Leaves: common petiole 1-4 cm. l., the larger with 3-4 pairs of leaflets, the smaller with 2-3 pairs, occasionally abortive; leaflets somewhat unequal in size, the larger at the apex of the leaf, 1-2 cm. l., 3-9 mm. br., elliptical to narrowly elliptical, unequal-sided especially the leaflets at the apex which are also very

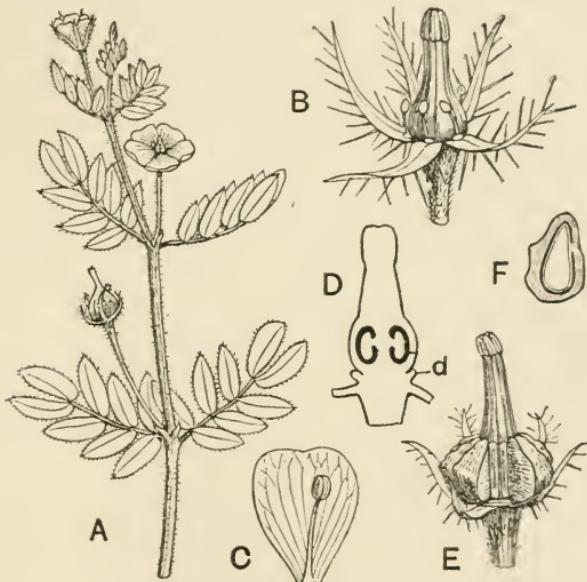


Fig. 54.—*Kallstroemia maxima* Torr. & Gr.

- A, Flowering branch with leaves $\times \frac{2}{3}$.
 B, Flower with the petals and the five larger stamens adhering to them removed $\times 5$.
 C, Petal with its stamen $\times 2$.

- D, Pistil and receptacle cut lengthwise $\times 5$; d, hypogynous disk.
 E, Fruit with the calyx, two of the coccii detached, $\times 3$.
 F, A coccus cut lengthwise, showing the seed and embryo, $\times 2$.

(After A. Gray.)

oblique, more or less glabrescent, the margins often hairy; stipules persistent, 4-5 mm. l. Flowers solitary; peduncle about as long as, or a little longer than, the opposite leaf. Sepals narrowly lanceolate or linear-lanceolate, acuminate, increasing in length in fruit, but shrivelled, 4-6 mm. l. Petals obovate, veiny, 6-8 mm. l. Stamens 3-4 mm. l. Fruit 8-9 mm. l.; cocci 4-5 mm. l., rough with transverse ridges.

FAMILY XLV. RUTACEÆ.

Shrubs or trees, usually glandular-dotted and strongly smelling. Leaves with pellucid dots, without stipules, generally opposite, and compound, digitate or pinnate, with 1, 3, or 5, or more leaflets. Flowers hermaphrodite, polygamous, or diœcious; parts usually in 4's or 5's. Sepals and petals imbricate. Stamens as many as, or twice as many as the petals, numerous in *Peltostigma*. Carpels generally 4 or 5 (8 in *Peltostigma*), united into a single 4-5-celled ovary, or free at the base and united in styles or stigmas, or altogether free and 1-celled. Ovules generally 2 in each carpel, superposed, ascending, with ventral raphe and superior micropyle, solitary in *Glycosmis* and *Triphasia*, numerous in *Citrus*. Fruit various. Embryo straight or curved. Cotyledons often fleshy. Endosperm present or wanting.

Species 800 or 900, natives of the temperate and warm regions of the whole world; specially numerous in S. Africa and Australia.

- | | |
|--|-------------------------|
| Calyx, 2 sepals larger. Corolla united below into a tube..... | 1. <i>Ravenia</i> . |
| Calyx regular, or with 1 sepal larger (<i>Peltostigma</i>). Petals not united. | |
| Ovary 2-5-lobed. Fruit of 1-8 cocci. | |
| Leaves pinnate | 2. <i>Zanthoxylum</i> . |
| Leaves digitate. | |
| Stamens numerous. Coccii 8 | 3. <i>Peltostigma</i> . |
| Stamens 4-5. Coccii 5 | 4. <i>Esenbeckia</i> . |
| Ovary entire. | |
| Fruit baccate. | |
| [Stamens 10. Leaves 1-5-foliolate | <i>Glycosmis</i> .] |
| [Stamens 6. Leaves 3-foliolate | <i>Triphasia</i> .] |
| [Stamens numerous. Leaves 1-foliolate...] | <i>Citrus</i> .] |
| Fruit drupaceous. | |
| Floral parts in 4's. Ovary 1-celled | 5. <i>Amyris</i> . |
| Floral parts in 5's. Ovary 3-celled..... | 6. <i>Spathelia</i> . |

1. RAVENIA Vell.

Shrubs or trees. Leaves opposite, 3-foliolate or simple. Peduncles axillary, few-flowered. Sepals 4 or 5, 2 outer larger, enclosing the bud. Corolla: tube straight, limb oblique with 4 or 5 somewhat unequal segments. Disk cup-shaped, crenate, 4-5-lobed, enclosing the ovary. Stamens 4 or 2; filaments adherent to the corolla-tube; anthers 2-4 at the corolla-throat, staminodes 3-1, linear, exserted. Ovary of 4-5 carpels, immersed in the disk; style 1, slender; stigma 4-5-lobed; ovules 2 in each cell, superposed. Capsule surrounded by the

persistent calyx, with 5–1 cocci; cocci 2-valved; endocarp hard and brittle. Seeds 1 or 2 in each coccus; endosperm in a thin layer; embryo curved; cotyledons 2-lobed, conduplicate, enclosing a long radicle.

Species 5 or 6, natives of West Indies and tropical S. America.

- Leaves 3-foliolate 1. *R. spectabilis*.
Leaves simple 2. *R. Swartziana*.

1. *R. spectabilis* Planch. ex Griseb. Mem. Amer. Acad. n.s. viii. 170 (1860) & Fl. Br. W. Ind. 710; leaves 3-foliolate.—Engl. in Fl. Bras. xii. pt. 2, 126; Urb. in Jahrb. Bot. Gart. Berl.

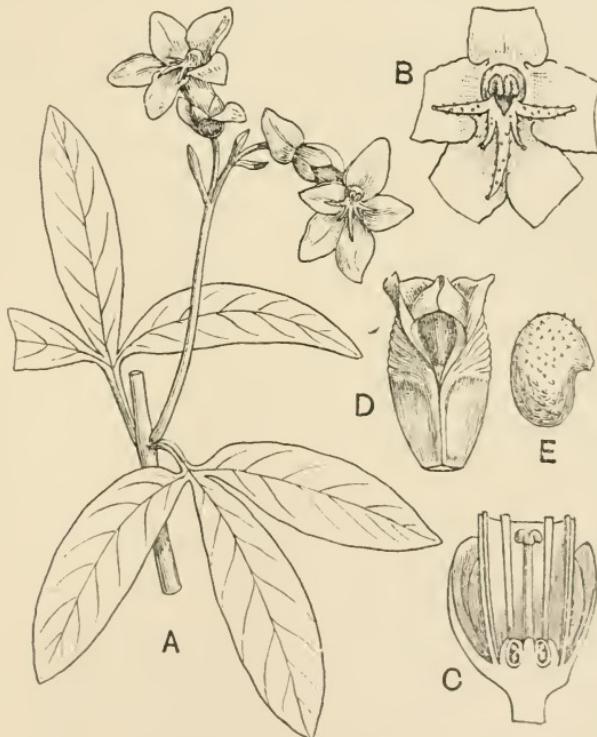


Fig. 55.—*Ravenia spectabilis* Griseb.

- A, Inflorescence and leaves $\times \frac{3}{2}$.
B, Flower: portion, to show stamens and staminodes, enlarged.
C, Pistil with ovary cut lengthwise, enlarged (*R. infelix*).
D, Coccus, inner side, $\times 4$.
E, Seed $\times 4$.
(A, B, after Bot. Reg.)

ii. 369, t. 13, f. 1–6 & in Engl. Jahrb. xxi. 551; P. Wils. in N. Amer. Fl. xxv. 177. *Lemonia spectabilis* Lindl. in Bot. Reg. xxvi. t. 59 (1840); Paxton's Mag. Bot. xiv. t. 73, opp. 73. (Fig. 55.)

March! cult. Hope Gardens, Harris!—Cuba, Hispaniola, Guadeloupe.

Shrub. Leaves digitately 3-foliate, glabrous, glandular-dotted, dots more or less pellucid; leaflets narrowly elliptical to oblong, 3–5 cm. l.; petiole 1–2 cm. l. Peduncle 1–3-flowered, 2–6 cm. l. Flowers markedly proterandrous. Sepals 5, glandular-dotted, 2 outer ovate, obtuse, 1·1–1·3 cm. l., 7–10 mm. br., 3 inner much shorter, roundish, adpressed to the tube of the corolla. Corolla purplish-red or pinkish, glandular-dotted, fleshy; tube 1·3 cm. l.; lobes somewhat unequal, the upper being the shorter. Stamens glandular-dotted, 3 lower linear, sterile, the middle one 3-lobed, the 2 lateral and each branch ending in a gland. Seeds ellipsoidal, muriculate, about 3·5 mm. l.

2. *R. Swartziana* Fawc. & Rendle in *Journ. Bot. lv.* 38 (1917); leaves simple.—*Pomphidea Swartziana* Miers *Apocyn. S. Amer.* 19, t. 1. D (1878); *Urb. Symb. Ant.* vi. 96. Type in Herb. Mus. Brit.

Jamaica (without locality), *Swartz*!

Leaves glabrous, glandular-dotted, elliptical, shortly acuminate, 4–8·5 cm. l.; petiole 2–3 mm. l. Peduncle to 1 cm. l., about 2-flowered; pedicels 2–3 mm. l. Sepals glandular-dotted, puberulous; 2 outer ovate, 6–7 mm. l., 2–3 mm. br., inner lanceolate, about half as long. Corolla glandular-dotted, fleshy; tube 7 mm. l., lobes somewhat unequal, about 5 mm. l. Stamens glandular-dotted, 1 or 2 sterile.

The examination of Swartz's specimen on which Miers founded the genus *Pomphidea*, of which it is the only representative, shows conclusively that it is a species of *Ravenia*.

2. ZANTHOXYLUM L.

Shrubs or trees. Leaves alternate, pinnate with or without an odd leaflet. Inflorescence cymose, usually paniculate. Flowers polygamous or dioecious. Calyx 3–5-cleft. Petals 3–5, imbricate or valvate. Male flower: Stamens 3–5, hypogynous. Female flower: Stamens none or scale-like. Carpels 1–5, 1-celled; styles sublateral; ovules 2 in each cell, collateral. Carpels separating in the fruit, opening by the ventral suture, each with one pendulous black seed. Endocarp loose or adherent. Embryo straight or curved, in the axis of fleshy endosperm, with round flat foliaceous cotyledons, and a very short radicle.

Species, about 140, natives of the tropics and warm regions of the whole world.

§ 1. Petiole and rhachis of leaves not winged. Leaflets opposite or alternate; pellucid dots many, all over the leaflet. Inflorescence a terminal panicle. Floral parts in 5's, sometimes in 4's in *Z. flavum*.
Leaflets with many pellucid dots.

- Twigs, leaves, inflorescence glabrous..... 1. *Z. elephantiasis*.
- Twigs, petioles, inflorescence puberulous
with simple hairs..... 2. *Z. martinicense*.
- Leaflets with very many pellucid dots. Twigs,
petioles, rhachis of inflorescence with minute
star-shaped hairs 3. *Z. flavum*.

- § 2. Petiole and rhachis more or less winged. Leaflets opposite; pellucid dots few, mostly marginal, or wanting. Inflorescence mostly lateral, spike-like. Floral parts in 4's. Carpels 2 or 1. Cocci 1 or 2.
- Leaflets mostly narrowly elliptical, 2·5–5 cm. l. 4. *Z. insulare.*
 - Leaflets mostly obovate-roundish, 1–2·5 cm. l. 5. *Z. Fagara.*
 - Leaflets obovate-oblong or linear-oblong, entire, ·4–1 cm. l., 2-glandular at base..... 6. *Z. spinifex.*
- § 3. Petiole and rhachis grooved, not winged. Leaflets opposite; pellucid dots numerous. Inflorescence paniculate, terminal and lateral. Floral parts in 4's. Coccus 1..... 7. *Z. rhodoxylon.*
- § 4. Petiole and rhachis grooved, not winged. Leaflets opposite; pellucid dots few, mostly marginal, or wanting. Inflorescence mostly paniculate, terminal and in upper axils, corymbose. Floral parts in 3's. Cocci 1–3.
- Inflorescence clustered, axillary, shorter than petiole. Ovary of 2 carpels..... 8. *Z. trifoliatum.*
 - Inflorescence terminal and in upper axils, corymbose.
 - Ovary of 3 carpels.
 - Leaves with an odd leaflet.
 - Apex of leaflets rounded, entire ... 9. *Z. Hartii.*
 - Apex of leaflets shortly acuminate, emarginate 10. *Z. jamaicense.*
 - Leaves without, sometimes with, an odd leaflet.
 - Apex of leaflets obtuse or rounded, emarginate, or broadly and obtusely acuminate.
 - Leaflets 1·5–6 cm. l. 11. *Z. spinosum.*
 - Leaflets 7–18 cm. l. 12. *Z. negrilense.*
 - Ovary of 1 carpel.
 - Leaves without an odd leaflet.
 - Apex of leaflets usually somewhat narrowly acuminate, more or less emarginate 13. *Z. acuminatum.*

§ 1. Prickles, if present, straight or slightly incurved, scattered on the branches. Leaves with petiole and rhachis not winged nor grooved; leaflets opposite or alternate; pellucid dots many, all over the leaflet. Inflorescence terminal, paniculate. Floral parts in 5's, or, in *Z. flavum*, in 5's or 4's. Carpels 5, but 2 (3–1) in *Z. flavum*.

1. *Z. elephantiasis* Macf. *Jam. i.* 193 (1837); twigs, leaves, and inflorescence glabrous; leaflets coarsely crenate, with many scattered and marginal pellucid dots; floral parts in 5's; carpels 5; cocci 5–1, separate, stalked.—*P. Wils. in N. Amer. Fl. xxv.* 193. *Z. aromaticum* DC. *Prodr. i.* 727 (1824) (excl. syn. *Jacq.*); *Griseb. Fl. Br. W. Ind.* 138 (as regards plants from Jamaica and

Haiti) (non Willd.). *Fagara elephantiasis* Kr. & Urb. in Engl. Jahrb. xxi. 564 (1896).

Yellow Sanders.

Macfadyen; *Prior*! Green Valley, J.P. 1453, *Morris*! Port Royal Mts., Bot. Dept.! St. James, *Dewar*! Green Valley; Sheldon road; Chester Vale, 3000 ft.; Old England, Blue Mts., 3000 ft.; Berwick, 2500-3000 ft.; Grandvale, Westmoreland, 500 ft.; Negril, sea-coast; Peckham, Clarendon, 2500 ft.; *Harris*! Fl. Jam. 5104, 5189, 5192, 5401, 5471, 5499, 5663, 6310, 6534, 6688, 6772, 7054, 10,018, 10,221, 11,198.—Cuba, Hispaniola, Mexico, Costa Rica.

Tree 15-40 ft. high, with corky conical spiny knobs, if present, only at the base of the trunk. *Branches* without spines. *Leaves* with an odd leaflet, 1-2·5 dm. l.; leaflets in 5-6 (2-8) pairs, opposite or nearly so, ovate-elliptical or oblong-lanceolate, somewhat acuminate, base more or less unequal-sided, 5-10 cm. l.; petiolules 3-6 mm. l. *Panicles* with corky wrinkled rhachis. *Pedicels* 1-2·5 mm. l., increasing to 5 mm. in fruit. *Sepals* 5, imbricate in bud, roundish, leathery, not corky, 1·3-1·8 mm. l.; 1·5-2 mm. br. *Petals* 5, 5-6 mm. l., elliptical or elliptical-oblong. *Male flowers*: filaments 5, about as long as the petals; ovary rudimentary. *Fruit*: cocci with glandular dots forming tubercles, usually 5, obovate or subobliquely orbiculate, 6-8 mm. l.; stalks 3-8 mm. l.; diverging star-like from one another. *Seeds* nearly as long as the cocci.

2. *Z. martinicense* DC. *Prodr. i.* 726 (1824); dioecious; twigs, leaves, and inflorescence puberulous with simple hairs; leaflets entire or slightly crenate, with pellucid dots at the margin and several scattered on the leaflet; floral parts in 5's; carpels 5; cocci 5-2, more or less united below.—*P. Wils. tom. cit.* 194. *Z. foliis oblongo-ovatis* &c. *Browne Hist. Jam.* 189. *Z. clava-Herculis* *Sw. Obs. Bot.* 375 (1791) (non L.); *Lun. Jam. ii.* 95; *Wright Mem.* 240; *Macf. Jam. i.* 194; *Griseb. loc. cit.* (excl. syn. *Descourt.* & *Lam.*). *Z. caribaeum* *Hitchc. in Rep. Miss. Bot. Gard.* (1893), 68 (non *Lam.* according to Urban). *Euonymo affinis arbor spinosa* &c. *Sloane Cat.* 138 & *Hist. ii.* 28, t. 172. *Fagara martinicensis* *Lam. Tabl. Encyc. i.* 334, n. 1639 (1791) & *Ill. t.* 811, f. 1; *Poir. in Lam. Encyc. Suppl. ii.* 627; *Urb. in Engl. Jahrb. xxi.* 564 (1896) (with diagram C on p. 557), & *Symb. Ant. iv.* 316; *Bull. Dept. Agri. Jam., new ser., i.* 22 & *photo* (1909).

Prickly Yellow, Yellow Hercules.

Sloane Herb. v. 102*, 103, 104! *Browne*; *Broughton*! Green Valley, Port Royal Mts., *Macfadyen*! St. Mary, *McNab*! Manchester mountains, *Purdie*! *Wilson*! *Moneague*, *Prior*! *March*! *Lucea*, *Hitchcock*; near *Cinchona*, Bot. Dept.! near Sheldon; Berwick, 2500 ft.; Green Valley, 1800 ft.; Hall's Delight; Yallahs Valley; Robertsfield, 2000 ft.; near Troy, 2000 ft.; *Harris*! Fl. Jam. 5275, 5293, 5360, 5399, 5501, 5599, 6687, 6689, 7712, 9092.—West Indies.

Tree 20-40(-80) ft. high; trunk to 3 ft. and more in diam., with numerous corky conical spiny knobs (to 1·5 cm. l. and br.); twigs with or without prickles (2-4 mm. l.). *Leaves* 1-3 dm. l., with or without an odd leaflet; petiole, rhachis, and midrib puberulous; with or without small prickles on the rhachis and on the midrib of the leaflets beneath; leaflets

variable in number, in 4-7(-15) pairs (young shoots with more leaflets than those more mature), opposite or alternate, sessile or subsessile, oblong-elliptical or oblong-lanceolate or oblanceolate, apex rounded, sometimes obtuse to shortly acuminate, base unequal-sided, 5-10 (3-13) cm. l. Panicles terminal, rarely lateral. Flowers subsessile. Sepals 5, open in bud, triangular, membranous, about 5 mm. l. Petals 5, 1.5-2 mm. l., elliptical. Male flowers: filaments 5, about half as long again as the petals. Fruit: cocci glandular-dotted, obliquely ovate to orbicular, about 5 mm. l. Seeds about 4 mm. l.

The wood is of a light yellow colour and even grain, saws readily straight, is useful for furniture and inside work, but does not last when exposed. Weight 60 lbs. per cubic foot.

3. *Z. flavum* Vahl *Ecolg. iii.* 48 (1807); dioecious; puberulous on twigs, petioles, and rhachis of inflorescence with minute star-

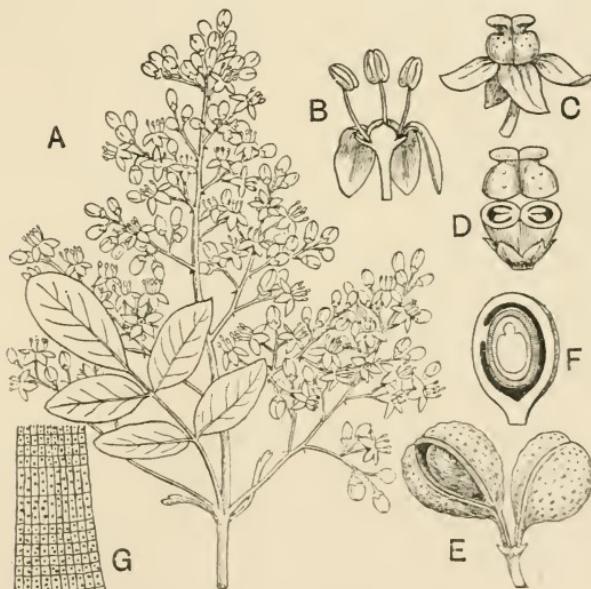


Fig. 56.—*Zanthoxylum flavum* Vahl.

- A, Inflorescence with a young leaf $\times \frac{2}{3}$.
- B, Male flower cut lengthwise $\times 3$.
- C, Female flower $\times 3$.
- D, Pistil cut across $\times 4$.
- E, Fruit of 2 cocci, one open showing the seed, $\times 2$.

- F, Coccus cut lengthwise, showing seed with endosperm and embryo.
- G, Cross-section of small portion of wood about $\frac{1}{4}$ inch long, showing, with the aid of a lens, the vessels as minute dots, numerous and evenly dispersed in the rings.

shaped hairs; leaflets entire, sometimes slightly crenate, with very numerous pellucid dots; floral parts in 4's or 5's; carpels 2 (3-1); cocci 1, sometimes 2.—P. Wils. *tom. cit.* 196. *Z. cibrosorum* Spreng. *Syst. i.* 946 (1825); Sarg. *Silv. i.* 71, t. 30, 31. *Z. Sumach* Griseb. *Pl. Carib.* 42 (1857) & *Fl. Br. W. Ind.* 138 (non Macf.). *Fagara flava* Kr. & Urb. in *Engl. Jahrb.* xxi 571 (1896) (with

diagram E on p. 557); *Urb. Symb. Ant.* iv. 317; *Fawc. in Bull. Bot. Dep. Jam.* iv. 73-74, with 4 figs. (Fig. 57.)

Jamaican Satin Wood, Yellow Sanders.

March! Shearer! Pedro, Graham! Lacovia, Tomlinson! Milk River, Nixon! Southfield, 1500 ft., Port Henderson; *Harris!* Fl. Jam. 6466, 7068, 10,150.—Bermuda, Florida Keys, Bahamas, Hispaniola, Porto Rico, St. John, Montserrat, Guadeloupe, Marie-Galante, Martinique, St. Lucia.

Shrub or tree, without spines or prickles, 10-35 ft. high; trunk 10-20 inches in diam. Leaves 1-3 dm. l., crowded at the ends of twigs, generally with an odd leaflet; petiole 5-1 dm. l.; leaflets in 3-5 (1) pairs, opposite, subsessile, ovate to lanceolate or elliptical-oblong, generally acuminate, base rounded or obtuse, unequal-sided, 5-12 cm. l., margin slightly recurved. Pedicels 1-4 mm. l. Sepals open in bud, triangular, papery, puberulous-ciliate, about .5 mm. l. Petals greenish-white, glandular, 3-4 mm. l. Fruit: cocci obovate-roundish, 4-6 mm. l.

In hardness and grain the wood is like boxwood; it is of a yellowish colour and satiny lustre with a rippled pattern in longitudinal section, and is capable of taking a beautiful polish. It is used for turnery, for brush-backs, cabinet work, furniture, etc. Weight about 56 lbs. per cubic foot of the dry wood.

§ 2. Prickles, if present, straight or slightly recurved, generally stipular on the branches. Leaves with petiole and rhachis more or less winged; leaflets opposite; pellucid dots few, mostly marginal, or wanting. Inflorescences of simple or branched spike-like racemes, or of flowers solitary or clustered; pedicels, if present, thickened. Floral parts in 4's. Carpels 2, or usually 1 in *Z. insulare*. Fruit of 1 or 2 nutlets.

4. *Z. insulare* Rose N. Amer. *Fauna xiv.* 79 (1899); leaflets crenate, narrowly elliptical or elliptical, lanceolate, obovate to oblanceolate, 2.5-5 cm. l.; inflorescences several, lateral and terminal; carpels 1, or occasionally 2 in terminal flowers; coccus 1.—*P. Wils. tom. cit.* 189. *Z. Pterota* Macf. *Jam. i.* 190 (1837) (excl. syn.) (non *H. B. & K.*). *Fagara culantrillo* Kr. & *Urb. in Engl. Jahrb. xxi.* 574 (1896).

Port Royal Mts., &c., Macfadyen; Fairfield, Wullschaegel; Sheldon; Robertsfield; Yallahs Valley; Tweedside, St. Andrew; Mt. Lebanon, 2500 ft.; Green Valley; Pleasant Hill, 2500 ft.; Watson's Hill, 1000 ft.; Malvern, 2200 ft.; *Harris!* Fl. Jam. 5157, 5193, 5202, 5263, 5294, 5371, 5516, 5544, 5605, 5611, 5661, 6130, 6301, 6507, 6528, 9662.—Venezuela, Colombia, Peru, Tres Marias and Socorro Is.

We have not seen Rose's specimen from Maria Madre Is., but according to P. Wilson it is specifically the same as the Jamaican plant, and the species, he says, is found also in Socorro Is. and in northern and western S. America.

Tree, 20-30 ft. high, with corky conical knobs occurring sparingly at base of trunk and on the lower limbs, very rarely with prickles on the branches. Leaves 7-10 cm. l.; leaflets 7-15, unequal-sided, apex obtuse, sometimes emarginate, base usually acute, turning blackish in drying, generally glandular-dotted, sessile or subsessile. Inflorescence 4-10 cm. l.,

glabrous; bracts $\cdot 5$ – 1 mm. l., ciliolulate. *Sepals* 4, of male flower about 1 mm. l., slightly imbricate at the base; of female flowers imbricate, shorter, roundish, the outer broader than long. *Petals* 4, of male flowers about 3 mm. l., oblong-elliptical; of female flowers about 2 mm. l., elliptical. *Stamens* 4, in male flower slightly longer than the petals, wanting in female flowers or staminodes developed. *Pistil* of male flower rather shorter than the petals, sterile. *Coccus* 5 – 7 mm. l., subglobular, outer surface wrinkled, with or without brown glandular dots; endocarp at length free, and dropping out with the seed. *Seed* 3 – 4 mm. in diam., subglobular.

5. *Z. Fagara* Sarg. in *Gard. & Forest* iii. 186 (1890) & *Silv. i.* 73, t. 32; leaflets obovate to roundish or sometimes elliptical, margin slightly wavy, $1\text{--}2\cdot5$ ($\text{--}3\cdot5$) cm. l.; inflorescence in spike-like racemes, solitary or 2–3 in the axils, or sometimes forming a sort of head; carpels 2; cocci 1 or 2.—*P.* Wils. *tom. cit.* 190. *Z. Pterota* H. B. & K. *Nov. Gen. & Sp. vi.* 3 (1823); *DC. Prodr. i.* 725; *Nutt. Sylv. iii.* 11, t. 84. *Lauro affinis* Jasmini &c. *Sloane Cat.* 137 & *Hist. ii.* 25, t. 162, f. 1. *Pterota subspinosa* &c. *Browne Hist. Jam.* 146, t. 5, f. 1. *Schinus Fagara* L. *Sp. Pl.* 389 (1753). *Fagara Pterota* L. *Syst. ed.* 10, 897 (1759); *Anaen. v.* 393 & *Sp. Pl. ed.* 2, 172; *Descourt. Fl. Ant. vii.* t. 455; *Urb. in Engl. Jahrb. xxi.* 575. *F. lentiscifolia* Humb. & Bonpl. ex Willd. *Enum. i.* 165 (1809); *Griseb. Fl. Br. W. Ind.* 137. *F. microphylla* Griseb. *loc. cit.* (1859) (as regards the Jamaican specimen). The type of *Schinus Fagara* L. is in Herb. Sloane. *Fagara Pterota* L. is based on a specimen from Browne; a specimen from Browne so named in Solander's hand is in Herb. Linn.

Saven Tree, Bastard Ironwood.

Sloane Herb. v. 87! *Browne!* *Wright!* *Shakspear!* J.P. 1074, *Morris!* near Kingston on sea-shore, *Fawcett!* Liguanea Plain, 600–800 ft.; near Bull Bay, 200 ft.; Long Mountain, west and south, 800–50 ft., *Harris!* Fl. Jam. 5678, 6732, 6733, 8373, 8384, 8388, 8841, 9579.—Bahamas, Cuba, Hispaniola, Trinidad, tropical and subtropical continental America.

Shrub or *tree*, 6–30 ft. high; trees more or less armed, trunk with corky conical knobs with an apical spine, branches sometimes with slightly recurved prickles in the place of stipules. *Leaves* 4–8 cm. l., with the rachis and usually also the petiole narrowly winged; leaflets 7–9($\text{--}11$), somewhat equal-sided or occasionally unequal-sided, apex rounded, generally emarginate. pellucid dots absent except sometimes a few marginal. *Inflorescence* $\cdot 7$ – 2 cm. l.; bracts persistent, about $\cdot 5$ mm. l. *Flowers*: male and female on separate plants. *Sepals* slightly imbricate at base in bud, of male flower somewhat square with a triangular apex, about 1 mm. l., of female about $\cdot 7$ mm. l. *Petals* of male flower about 3 mm. l., oblong or oblong-obovate. *Stamens* longer than the petals. *Pistil* in male flowers about half as long as petals, sterile; in female flowers on a gynophore branching above into the stalks of the two carpels. *Coccoi* about 3 mm. l., subglobular, with minute glandular dots; endocarp at length free. *Seed* $2\cdot5$ – 3 mm. l. and thick.

The heartwood is brown tinged with red, with a thin yellowish sapwood. The wood is hard and very close-grained. Weight about 46 lbs. per cubic foot of the dry wood.

6. *Z. spinifex DC.* *Prodr. i.* 728 (1824); leaflets entire, obovate to linear-oblong, base with 2 glands beneath, .4–1 cm. l., .2–.5 cm. br.; inflorescence sessile, axillary, consisting of one flower or a cluster of a few flowers; carpels 2; nutlets 1 or 2.—*P. Wils. tom. cit.* 187. *Fagara spinifex Jacq. Fragm.* 10, *t. 6, f. 2* (1809); *Urb. in tom. cit.* 577 & *Symb. Ant.* iv. 318. *F. microphylla Desf. Tabl. i.* 200 (1804) (name only); *Ham. Prodr.* 21 (1825); *Griseb. Fl. Br. W. Ind.* 137 (excl. ref. *Br. & L.*). *Rhus Obsoniorum similis leptiphyllus, Tragodes &c. Pluk. Phyt. t. 107, f. 4, Alm.* 319.

Sloane Herb. v. 88!—Porto Rico, St. Cruz, Buck Is., St. Kitts, Nevis, Antigua, Guadeloupe, Désirade, Dominica, Martinique, St. Lucia, Barbados, Venezuela.

Shrub 3–16 ft. high; branches almost always bearing straight stipular spines. Leaves with an odd leaflet; petiole and rhachis winged, very rarely with a short solitary spine here and there beneath between the pair of leaflets; leaflets 5 (7–9, rarely 11), form very variable, on flowering twigs generally obovate to oblong, apex rounded or emarginate, on sterile twigs, often linear-oblong, margin obscurely crenate, often with a gland at the notch, pellucid dots wanting, except sometimes one at the apex when emarginate. *Floral parts in 4's, rarely in 5's. Male flowers:* Sepals .5 mm. l., .7 mm. br., inner narrower. Petals 1·6–2 mm. l. Stamens longer than petals. *Female flowers:* styles long persistent, stigmas united. *Cocci* sessile or subsessile, globular, 2·5–3 mm. in diam., keeled on one side; endocarp brown, separable.

§ 3. Prickles wanting. Leaves with petiole and rhachis grooved, not winged; leaflets opposite; pellucid dots numerous. Inflorescence paniculate, terminal and in the upper axils. *Floral parts in 4's. Fruit of 1 coccus.*

7. *Z. rhodoxylon P. Wils. in Bull. Torr. Bot. Club xxxvii. 85* (1910) & in *N. Amer. Fl.* xxv. pt. 3, 191. *Fagara rhodoxylon Urb. Symb. Ant. v.* 530 (1908).

Rose wood, Caesar-wood.

Tyre, near Troy, 2000 ft.; Fray woods, 1600 to 1800 ft.; Peckham, Clarendon, 2500 to 2800 ft.; Harris! Fl. Jam. 9992, 10,347, 10,866, 11,044.

Tree 25–50 ft. high; trunk up to 2 ft. in diam. Leaves equally pinnate; rhachis and petiole, 3–6(–8) cm. l.; leaflets in 1–2(–3) pairs, obovate to oblanceolate, or elliptical-oblong, sessile, apex obtuse to rounded, sometimes truncate or emarginate below, tapering gradually to the base, generally equal-sided, shining above, nerves with veins joining them prominent on both sides, 4–7 cm. l., 3·5–1·5 cm. br.; margin entire; surface on both sides but especially beneath, marked with very numerous glandular dots more or less pellucid. Panicles 3–5 cm. l. *Male flowers:* Sepals 4, free, shortly triangular, open in bud, .5 mm. l. Petals 4, narrowly imbricate, ovate, 2–2·5 mm. l., glandular. Filaments 4, to 1·5 mm. l.; anthers heart-shaped. Ovary very rudimentary. *Female flowers* not known. Coccus globular, wrinkled, not keeled, 5–6 mm. l.; endocarp not becoming loose.

§ 4. Prickles, if present, straight, generally scattered on the branches, stipular in *Z. trifoliatum*. Leaves with petiole and rhachis grooved, not winged; with or without an odd leaflet; leaflets opposite; pellucid dots few, mostly marginal, or wanting. Inflorescence paniculate, sometimes corymbose, terminal and in upper axils; pedicels, if present, slender. Floral parts in 3's. Carpels 3, 2, or 1. Fruit of 1-3 cocci.

8. *Z. trifoliatum* Wright Mem. 240 (1828) (non L.); leaves with an odd leaflet; leaflets usually 3, obovate-elliptical to elliptical-lanceolate, apex retuse or emarginate, rounded, obtuse, acute, or shortly acuminate; inflorescence axillary, clustered, racemose or paniculate, shorter than the petiole; carpels 2; cocci 2 (or 1).—*Z. punctatum* Vahl in West Bidr. Ste. Croix 310 (1793); *P. Wils.* in N. Amer. Fl. xxv. 182. *Z. ternatum* Sw. Fl. Ind. Occ. 570 (1797). *Fagara trifoliata* Sw. Prodr. 33 (1788); *Urb.* in Engl. Jahrb. xxi. 584. *Tobinia ternata* Ham. Prodr. 57 (1825); *Griseb.* op. cit. 136. *T. punctata* Griseb. op. cit. 137 (1859). The type, *F. trifoliata* Sw., is in Herb. Mus. Brit.

Toothache Tree.

Wright; *Bertero*.—West Indies (but not recorded from Cuba).

Shrub 6-25 ft. high. Branches: sterile, usually with stipular prickles, flowering, generally without prickles. Leaflets 3 (2-7), even 13 in young plants, 2·5-8 cm. l., 1·2-4 cm. br.; margin altogether or towards the apex obscurely crenulate, with black glandular dots beneath, rarely with a few pellucid dots. Inflorescence to 1·5 cm. l. Flowers shortly stalked. Sepals 3, 1·4-1·7 mm. l. Petals 3, 1·8-2·3 mm. l., white or yellowish-white, roundish-ovate or elliptical. Coccii globular, 3·5-4 mm. l., 3-3·5 mm. br.

Wright states that the root-bark of this species and of *Z. martinicense* DC. produces salivary discharge, and is serviceable in toothache.

Z. trifoliatum L. (Sp. Pl. 270), of which there is a specimen in Herb. Linnae., is *Acanthopanax aculeatum* Seem.

9. *Z. Hartii* P. Wils. in Bull. Torr. Bot. Club xxvii. 85 (1910) & in N. Amer. Fl. xxv. pt. 3, 185; leaves with an odd leaflet; leaflets elliptical, apex obtuse or rounded; inflorescence terminal and axillary, corymbose; carpels 3.—*Fagara Hartii* Kr. & Urb. in Engl. Jahrb. xxi. 556 (1896).

J.P. 1480, Hart; below John Crow Peak, 5800 ft., Harris! Fl. Jam. 6524 (Harris's specimen without either flowers or fruit).

Tree, 18 ft. high; trunk divided into several stems just above the ground; small stems armed with spines, branches unarmed. Leaves 2-6 cm. l.; leaflets 3-9, sometimes slightly unequal-sided, but base more so, 2-5 cm. l., margin crenulate, glandular-dotted beneath; pellucid dots along the margin, rarely within. Inflorescence (not seen by us) 1·5-2 cm. l.; bracts ovate to roundish-triangular, 1·5-1·7 mm. l. Female flowers not quite fully developed. Sepals 3, about 1 mm. l. Petals 3, elliptical, with rounded apex. Staminodes wanting. Gynophore short, disk-like. Ovary of 3 sessile carpels, slightly united above the base.

10. *Z. jamaicense* *P. Wils.* in *Torreya ix.* 32 (1909) & in *N. Amer. Fl. xxv. pt. 3,* 185; leaves with an odd leaflet; leaflets elliptical to oblong-elliptical, apex usually shortly and abruptly acuminate, rarely rounded, emarginate; panicles terminal, corymbose; carpels 3; cocci 2 or 1 with 1 or 2 aborted.

Dolphin Head, *Britton*, 2310! hills near Kempshot, *Britton*, 2433.

Tree 15–30 ft. high, trunk with corky spiny knobs at the base, branches unarmed or with a few slender straight prickles. *Leaves* 12–20 cm. l., sometimes, with the rhachis and midrib of leaflet beneath, prickly; leaflets in 1–4 pairs, sessile or subsessile (but terminal long-stalked), 9–3 cm. l., margin slightly crenulate or entire, nerves and veins reticulate, prominulous beneath, less so above, pellucid dots along the margin and very few within. *Male flowers* (immature): *Sepals* 3. *Petals* 3, ovate. *Stamens* 3. *Female flowers*: *Sepals* 3, semicircular or broadly triangular. *Petals* 3, ovate, 2–2·2 mm. l. *Carpels* distinct. *Cocci* globular, apiculate, surface pitted, 4 mm. in diam.

We have only seen a poor specimen, and have had to depend for the most part on *P. Wilson's* description.

11. *Z. spinosum* *Sw. Fl. Ind. Occ.* 574 (1797); leaves with or without an odd leaflet; leaflets 1·5–6 cm. l., roundish-elliptical, elliptical, or oblong-elliptical to ovate, apex rounded or obtuse, slightly emarginate, or broadly and obtusely acuminate; panicles terminal and axillary, corymbose; carpels 2–3; cocci 1–3.—*DC. Prodr. i.* 726; *Macf. Jam. i.* 192; *P. Wils. in N. Amer. Fl. xxv.* 186. *Z. emarginatum* *Sw. Fl. Ind. Occ.* 572 (1797); *DC. Prodr. i.* 726; *Macf. Jam. i.* 190. *Z. sapindoides* *DC. Prodr. i.* 728 (1824); *Macf. Jam. i.* 191. *Z. aculeatum* *Macf. loc. cit.* Lauro affinis terebinthi folio &c. *Sloane Cat.* 137 & *Hist. ii.* 24, *t.* 168, *f.* 4. *Sapindus fruticosus* caudice &c. *Browne Hist. Jam.* 207, *t.* 20, *f.* 2. *Sapindus spinosus* *L. Sp. Pl. ed. 2,* 526 (1762). *Fagara emarginata* *Sw. Prodr.* 33 (1788). *F. spinosa* *Sw. loc. cit.* *Tobinia coriacea*, *T. spinosa* and *T. emarginata* *Ham. Prodr.* 57 (1825); *Griseb. Fl. Br. W. Ind.* 137. *Fagara sapindoides* *Kr. & Urb.* in *Engl. Jahrb. xxi.* 587 (1896). *F. Swartzii* *Kr. & Urb. tom. cit.* 589. *F. spinosa* *Kr. & Urb. tom. cit.* 590 (non *Sw.*) *Swartz's types are in Herb. Mus. Brit.*

Lignum Rorum, Licca Tree, Suarra Wood.

Sloane Herb. v. 83! *Wright!* *Shakspear!* below Berwick House; Flamstead; *Macfadyen*; high woods, St. Ann, *Purdie!* *Wilson!* *March!* Ferry Pen, 150 ft., *Campbell!* Tweedside road, south St. Andrew, 2000 ft.; Content road, 2000 ft.; near Lititz, 500 ft.; Long Mt. south side, 500–800 ft.; Pedro Bluff; near Ferry, 200 ft.; Llandovery; Inverness, Clarendon, 200 ft.; *Harris!* *Fl. Jam.* 5665, 5666, 6281, 6290, 7220, 8934, 9575, 9728, 10,044, 10,375, 11,689.

Shrub 4–10 ft. high, or *tree* to 20 ft. high, spiny or unarmed; trunk armed with broad conical spiny knobs, or unarmed; twigs thickly covered with long straight spines or unarmed. *Leaves* 7–15 cm. l., with a pair of spines below the insertion of the leaflets on the upper side with a few other spines beneath, or unarmed; leaflets in 2–6(–10) pairs, sessile or subsessile, base rounded or obtuse, often unequal-sided, shiny on upper

surface, paler beneath, 1·5-6·5 cm. l., with or without spines on midrib beneath, nerves and veins reticulate, more or less prominent on both sides, margin entire or slightly crenulate, sometimes with pellucid dots along the margin, especially one at the apex, occasionally with glandular dots on one or both sides. *Peduncle* 3-6 cm. l.; pedicels to 2 mm. l. in flowers, to 4 mm. l. in fruit. *Bracts* triangular, ·5 mm. l. *Flowers* white, fragrant. *Male flowers*: *Sepals* 3, open in bud, united at base, roundish-deltoid, ·5-·7 mm. l. *Petals* 3, elliptical, imbricate, 2·5-3 mm. l. *Stamens* 3, slightly longer than the petals. *Pistil* sterile, of 2 carpels, united but styles distinct, or rudimentary. *Female flowers*: *Staminodes* wanting. *Pistil* about as long as the petals, carpels more or less united; stigma one, peltate; styles about half the length of the ovaries. *Cocci* slightly united at the base, with 1 or 2 abortive cocci, sessile, roundish-ellipsoidal, slightly apiculate, glandular-dotted or dots obsolete, 5-6 mm. l.; seeds 4·5-5·5 mm. l.

Sloane states that the wood is very fragrant when burning. Small stems are cut for use as walking sticks and umbrella sticks.

We think that all the various forms included here may be considered as one very variable species. Urban divides them into three species: *F. sapindoides*, leaves without an odd leaflet; leaflets 8, on both sides minutely dotted; inflorescence axillary shorter than the leaves; *F. Swartzii*, leaves with or without an odd leaflet; leaflets 12-20, 2·5-4 cm. l., sparingly dotted on the lower surface, with pellucid dots on the margin; inflorescence terminal; *F. spinosa*, leaves without an odd leaflet; leaflets 4-10, 3·5-6·5 cm. l., not dotted, with pellucid dots on the margin; inflorescence terminal.

12. *Z. negrilense* Fawc. & Rendle in *Journ. Bot. lv. 271* (1917); leaves without an odd leaflet; leaflets 7-13 cm. l., elliptical to oblong, apex obtuse, slightly emarginate, sometimes very shortly and abruptly acuminate, base unequal-sided, more or less rounded, pellucid dots wanting; panicles terminal, corymbose; carpels 3; cocci 1 or 2. Type in Herb. Jam.

In rocky woodland, near lighthouse, Negril, 300 ft., Harris! Fl. Jam. 10,242.

Small tree, 10 ft. high, without spines or prickles. Leaves 1·5-3 dm. l.; leaflets in 2-4 pairs, shining above, nerves and veins prominent on both sides, reticulate; margin entire; petiole and rhachis with a shallow groove above. Inflorescence about 8 cm. l. Cocci ellipsoidal, rough with wrinkles and glandular dots, keeled along one side where the valves split open, about 5 mm. l.; endocarp persisting, while the exocarp and seeds drop away; abortive carpids 1 mm. l.

13. *Z. acuminatum* Sw. *Fl. Ind. Occ.* 575 (1797); leaves without an odd leaflet; leaflets elliptical to oblong-lanceolate, generally somewhat narrowly acuminate, apex blunt and generally more or less emarginate; panicles terminal and axillary, corymbose; carpel 1; coccus 1.—*DC. Prodr. i. 726*; *Macf. Jam. i. 192*; *P. Wils. tom. cit. 183*. *Fagara acuminata* Sw. *Prodr. 33* (1788); *Kr. & Urb. in Engl. Jahrb. xxi. 593*. *Tobinia acuminata* Ham. *Prodr. 57* (1825). *T. coriacea* Griseb. *loc. cit.* (1859) (non Desv.). Type in Herb. Mus. Brit.

Wright! Dr. Lindsay! Tweedside, Macfadyen! March! J.P. 2087, Morris! Green Valley, 2500 ft.; Westphalia road, 3000 ft.; Grandvale,

Westmoreland, 500 ft.; Stanmore Hill, 2200 ft.; Harris! Fl. Jam. 5209 b, 5315, 6129, 6549, 6550, 7100, 9874.

Shrub or tree, 15–40 ft. high; trunk and sometimes the larger branches armed with somewhat flattened conical corky spines; twigs and leaves generally without spines. *Leaves* 3–18 cm. l.; leaflets in 2–4 pairs, base wedge-shaped, shining above, nerves and veins prominent on both sides, reticulate, 5–13 cm. l.; margin entire or obscurely crenulate; pellucid dots along the margin. *Inflorescence* 5–10 cm. l. *Male flowers*: *Sepals* 3, united below, open in bud, roundish-ovate, about 5 mm. l. *Petals* 3, broadly elliptical, very imbricate, concave, 2·3 mm. l. *Stamens* 3, a little longer than the petals. *Pistil* rudimentary, about 1 mm. l., 3-lobed at base, acuminate above. *Female flowers*: *Petals* 3, roundish-ovate, hooded, 2·5 mm. l. *Staminodes* none. *Gynophore* disk-like, about one-third as long as the ovary. *Carpel* with 2 ovules; style lateral. *Coccus* globular, slightly apiculate, rough with wrinkles and glandular dots, keeled along one side where the valves split open, 5 mm. l.; endocarp at length loose.

3. PELTOSTIGMA Walp.

A small tree. Leaves alternate, digitate, with 3 leaflets. Flowers large, sweet-scented, in a long-stalked few-flowered axillary corymb; pedicels with leafy deciduous bracts. Sepals 4 (3),

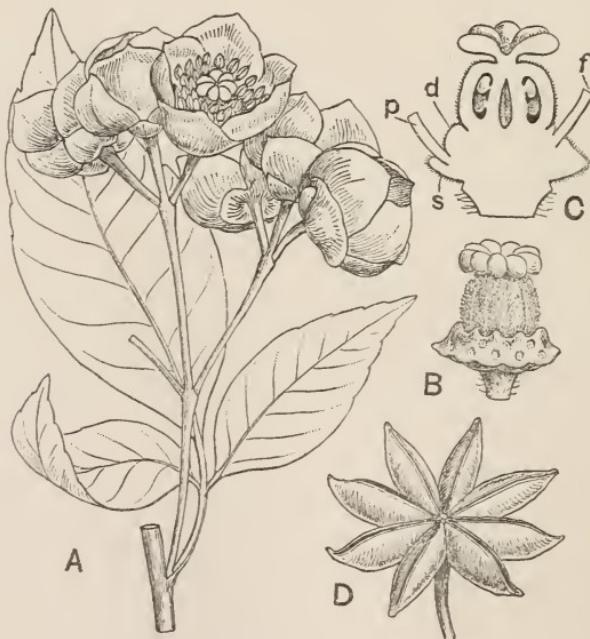


Fig. 57.—*Peltostigma pteleoides* Walp.

A, Portion of inflorescence and a leaf $\times \frac{2}{3}$.

B, Pistil and disk, showing the insertion of the stamens, much enlarged.

C, Flower cut lengthwise, showing sepal (s), base of petal (p), disk (d), base of

(A after Bot. Mag.; B, C after Engler.)

filament (f), ovary with ovules, and stigma, much enlarged.

D, Fruit showing the cocci opening above $\times \frac{2}{3}$.

deciduous, the inner petal-like, the 2 outer smaller, herbaceous. Petals 4. Disk thick, fleshy. Stamens numerous, unequal, inserted on the disk. Pistil consisting of 8 (6–10) one-celled carpels, united at the sides and free at the axis; stigma large, 8-lobed, subsessile. Ovules 2 in each cell, superposed or collateral. Coccii 8 (6–10), each with 2 (1) seeds.

Species 1, a native of Jamaica only.

P. pteleoides Walp. *Rep. v.* 387 (1845–46); *Griseb. Fl. Br. W. Ind.* 136; *Baill. Hist. iv.* 393, *f.* 443, 444; *Engl. in Engl.-Prantl Pflzfam. iii. pt. 4,* *f.* 69, n–r; *Urb. in Engl. Jahrb. xxi.* 554; *P. Wils. in N. Amer. Fl. xxv.* 206. *Pachystigma pteleoides* Hook. *Ic. Pl. t.* 698, 699 (1844); *Bot. Mag. t.* 4436. (Fig. 57.)

Candle Wood.

St. Cruz Mts., Purdie! Potsdam woodland, St. Cruz Mts., 2600 ft., Harris! Fl. Jam. 9800; also Britton, 1272! cult. in Hope Gardens, Harris! Tree to 25 ft. high, with a balsamic odour. Leaflets 3 (sometimes 5), elliptical to lanceolate or oblanceolate, entire or obsoletely serrate above, apex acute or shortly acuminate, tapering to base and decurrent into the petiolule, with very numerous pellucid dots, the terminal leaflet larger, 4–12 cm. l. Pedicels 1–2 cm. l., bracteolate at base; bracts and bracteoles deciduous, foliaceous, bracts about 1·5 cm. l., bracteoles about half as long. Flowers cream-coloured, fragrant. Sepals deciduous, 6–10 mm. l. Petals roundish-elliptical, concave, about 1·5 cm. l. Stamens 5–8 mm. l. Pistil 5–6 mm. l. Coccii about 2 cm. l., about 1 cm. br.

4. ESENBECKIA H. B. & K.

Trees or shrubs. Leaves alternate, digitate, 5(–3)-foliolate in *E. pentaphylla*; leaflets entire, with numerous pellucid dots. Panicles axillary and terminal. Calyx 4–5-lobed, or 4 or 5 sepals, imbricate. Petals 4–5, imbricate or valvate. Stamens 4–5, inserted at the base of the disk between the lobes. Ovary deeply 4–5-lobed, 4–5-celled; style basal; ovules 2 in each cell, collateral, affixed near the base of the interior angle. Capsule subglobose, muricate, echinate, or coarsely wrinkled, septicidally 5-carpellate; cocci loculicidally 2-valved, 1-seeded. Seeds without endosperm; cotyledons unequal, sometimes in a whorl of 3.

Species about 20, natives of tropical America (incl. the West Indies).

E. pentaphylla Griseb. *Fl. Br. W. Ind.* 135 (1859); *Urb. in Engl. Jahrb. xxi.* 553; *P. Wils. in N. Amer. Fl. xxv.* 201. *Galipea pentaphylla* Macf. *Jam. i.* 196 (1837). (Fig. 58.)

Wild Orange.

Near Green Valley works and below Mocha works, Blue Mts., Macfadyen! St. Ann, Purdie! Moncague, Prior! March; Mount Lebanon, 2500 ft.; Tweedside road, St. Andrew, 2000 ft.; Grandvale, Westmoreland, 500–2000 ft.; near Troy, 1800 ft.; slopes of Dolphin Head; Peckham, Upper

Clarendon, 2500 ft.; Ipswich, St. Elizabeth, 900 ft.; Harris! Fl. Jam. 5629, 5664, 7057, 8209, 9074, 10,285, 11,195, 12,367.

Tree 25–80 ft. high. *Leaflets* elliptical to oblong-elliptical, rarely obovate, 1–2 dm. l., glabrous. *Panicles* 2–5-branched, terminal. *Sepals* 5,

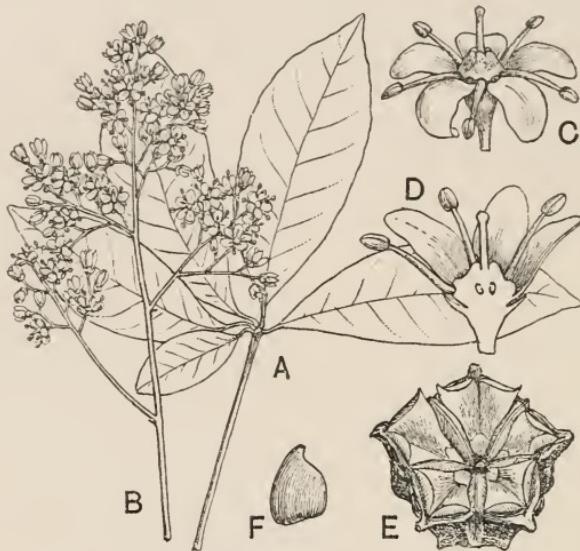


Fig. 58.—*Esenbeckia pentaphylla* Griseb.

A, Leaf $\times \frac{1}{2}$.

B, Inflorescence $\times \frac{2}{3}$.

C, Flower $\times 3$.

D, Ditto cut lengthwise $\times 4$.

E, Capsule from which the seeds have fallen $\times \frac{3}{2}$.

F, Seed $\times \frac{3}{2}$.

varying in form, roundish to transversely oblong-elliptical, 1·1–1·2 mm. l. *Petals* oblong-elliptical, pale yellow or yellowish-white, about 3–3·5 mm. l. *Capsule* 3·5–4·5 cm. br., 5-beaked at the apex, coarsely wrinkled, sometimes with small tubercles near the base; endocarp loose. *Seeds* blackish-brown, compressed, somewhat deltoid, about 1·2 cm. l.

[GLYCOSMIS Correa.]

Shrubs or trees without prickles. Leaves alternate, pinnate or 1-foliate, with numerous pellucid dots. Panicles axillary. Flowers small. Calyx 5-cleft, lobes imbricate. Petals 5, free, imbricate. Stamens 10, free. Ovary sessile on the disk, 2–5-celled; ovules one in each cell, pendulous. Berry with 1–3 seeds. Seeds without endosperm.

Species about 10, natives of tropical Asia and Australia.

G. pentaphylla DC. *Prodr. i.* 538 (1824); *Hook. f. Fl. Br. Ind. i.* 499; *P. Wils. in N. Amer. Fl. xxv.* 215. *G. citrifolia* Lindl. *Trans. Hort. Soc. Lond. vi.* 72 (1826). *G. cochinchinensis* Pierre ex Engl. in *Engl.-Prantl Pflzfam. iii. pt. 4,* 185, f. 106

(1896) & *Urb.* in *Engl. Bot. Jahrb.* *xxi.* 611 (1896). *Limonia pentaphylla* *Retz.* *Obs. v.* 24 (1789). *L. citrifolia* *Willd.* *Enum. Hort. Berol.* 448 (1809); *Macf. Jam. i.* 124. *L. parviflora* *Sims* *Bot. Mag. t.* 2416 (1823). *Toluifera cochinchinensis* *Lour. Fl. Cochinch.* 262 (1790).

Naturalized; *Macfadyen!* *St. Mary, McNab!* J.P. 1065, *Morris!* King's House grounds, J.P. 1107, *Hart!* Gordon Town, 900 ft.; Hope grounds; *Harris!* Fl. Jam. 6125, 6657, 6982, 9036.—Native of East Indies to Australia.

Shrub or tree, 6-10 ft. high, glabrous. *Leaves* 1-foliate or impari-pinnate, narrowly elliptical to lanceolate, entire (rarely crenulate), narrowing to apex and base, sometimes shortly acuminate, more or less unequal-sided at the base, 8-19 cm. l. *Calyx* about 1 mm. l., margin fringed. *Petals* white, elliptical to oblong-elliptical, 3-3.5 mm. l. *Berry* pale pink (or white), 7-9 mm. in diam.]

[TRIPHASIA Lour.

Spiny shrub. Leaves alternate, 3-foliate, with numerous pellucid dots, lateral leaflets smaller. Flowers solitary, axillary, white, fragrant. Calyx 3-lobed. Petals 3, free, imbricate. Stamens 6, free. Ovary sessile on the disk, 3-celled; ovules one in each cell. Berry 1-2-celled, with 1 or 2 seeds. Seeds without endosperm.

Species 1, native of China, cultivated and naturalized throughout the tropics.

T. trifolia *P. Wils.* in *Torreya ix.* 33 (1909) & in *N. Amer. Fl. xxv.* 221. *T. aurantiola* *Lour. Fl. Cochinch.* 153 (1790); *Risso Orang.* 209, *t.* 108; *Engl. in Engl.-Prantl Pflzfam. iii. pt. 4,* 190, *f.* 110. *T. trifoliata* *DC. Prodr. i.* 536 (1824); *Macf. Jam. i.* 124. *Limonia trifolia* *Burm. f. Fl. Ind.* 103, *t.* 35, *f.* 1 (1768) (the petals are incorrectly shown as 5 instead of 3). *L. trifoliata* *L. Mant.* 237 (1771); *Jacq. Ic. Pl. Rar. t.* 463. Loureiro's type is in *Herb. Mus. Brit.* A specimen named by Linnæus is in *Herb. Linn.*

Chinese Lemon.

Naturalized; *Parnell!* White Horses, near Yallahs Point, *Harris & Britton!* Fl. Jam. 10,592.—Distribution as of genus.

Risso (*loc. cit.*) says of this species: "Nous en possédonns un échantillon recueilli dans le jardin botanique de Jamaïque."

Shrub 5 or 6 ft. high. Spines slender, straight, in pairs in the axils of the leaves. Leaflets thick, ovate to elliptical, apex obtuse, emarginate, crenulate, 1.5-3 cm. l. *Calyx* puberulous, 1.5 mm. l. *Petals* linear-oblong, white, 1-1.5 cm. l. *Berry* globular, red, 1-1.5 cm. in diam., rind marked with glandular pits.]

[CITRUS L.

Trees and shrubs, usually spiny. Leaves 1-foliate, the petiole generally margined or winged; leaflet with pellucid dots.

Flowers hermaphrodite, often also with male flowers, sweet-smelling, axillary, solitary, clustered, racemose, or shortly paniculate. Calyx shallow-cup-shaped, 3-5-toothed. Petals 4-8, free, linear-oblong, thick, imbricate. Stamens 20-60, variously united, sometimes into several bundles. Disk large, supporting the ovary. Ovary with several cells; ovules 4-8 in 2 rows in each cell. Fruit baccate, large, of several sections,

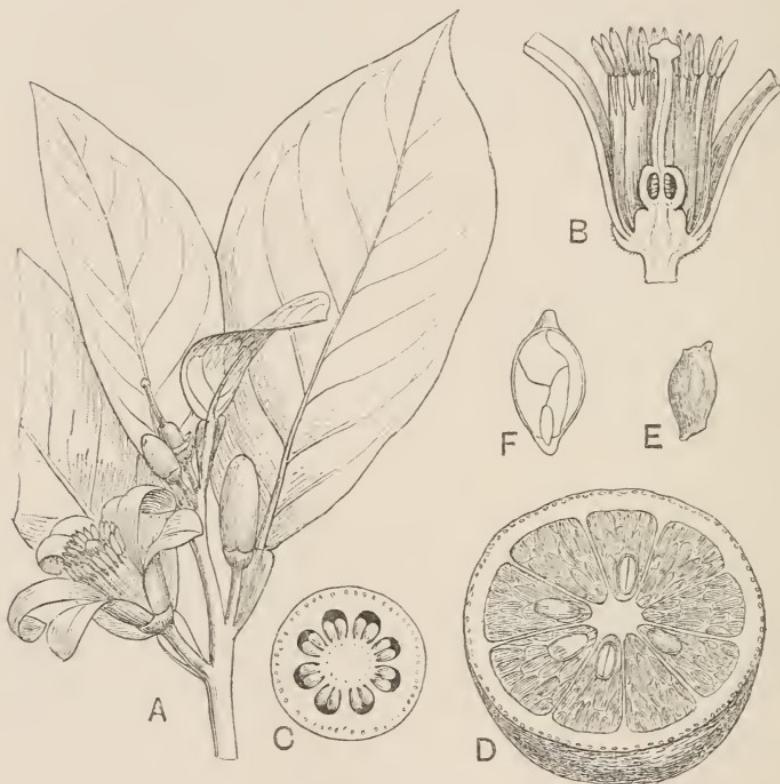


Fig. 59.—*Citrus Aurantium* L.

A, Shoot with leaves and flowers $\times \frac{2}{3}$.
 B, Flower cut lengthwise, with petals cut $\times 1\frac{1}{2}$.
 C, Ovary cut across, much enlarged.

D, Fruit cut across $\times \frac{1}{2}$.
 E, Seed $\times \frac{2}{3}$.
 F, Seed cut lengthwise, showing cotyledons $\times 2$.

the coverings of the sections membranous or leathery, the sections filled with transverse juicy cells. Seeds few in each section, horizontal or pendulous, sometimes with 2 or several embryos, without endosperm; cotyledons fleshy, flat-convex, often unequal.

Species 40 to 50, natives of southern Asia, but cultivated and often spontaneous in tropical and subtropical regions.

Petiole with or without a linear margin.

- Petiole not or scarcely jointed with leaflet. Fruit
- large, with thick firm rind 1. *C. medica*.
- Petiole evidently jointed with leaflet. Fruit smaller,
- with thin rind.
- Fruit oblong, apex usually nipple-shaped, rind close 2. *C. Limonum*.
- Fruit globular-depressed, rind loose..... 6. *C. nobilis*.

Petiole with a narrow sub lanceolate wing.

- Leaflet tapering to apex.
- Fruit oblong, apex usually nipple-shaped; pulp
- acid, yellow 2. *C. Limonum*.
- Fruit subglobular, small; pulp acid, greenish 3. *C. aurantifolia*.
- Fruit subglobular; pulp sweet and acid combined,
- yellow or sometimes red 4. *C. Aurantium*.
- Leaflet rounded at apex. Fruit subglobular or pear-
- shaped; pulp sweet, acid, and bitter combined... 8. *C. paradisi*.

Petiole broadly winged.

- Leaflet and petiole usually puberulous. Fruit large,
- with thick, spongy rind 7. *C. grandis*.
- Leaflet and petiole glabrous. Fruit smaller, with
- thinner firm rind 5. *C. vulgaris*.

1. *C. medica* L. Sp. Pl. 782 (1753) (excl. var.); leaflet broadly oblong or oblong-elliptical, 10–20 cm. l., apex usually rounded, margin serrulate-crenate; petiole very short, with or without a linear margin, more or less continuous with midrib; fruit very large, to 20 cm. l., pale or dark bright yellow; outer rind thin, yellow-coloured, aromatic, inner very thick, white or cream-coloured, slightly bitter, of a dense firm consistency; pulp scanty, subacid and somewhat bitter, pale.—*Risso in Nouv. Duhamel vii. 67 t. 22 & Orang. t. 96–100*; *Lunan Hort. Jam. i. 196*; *Macf. in Hook. Bot. Misc. i. 295 & Jam. i. 125*; *Lowe Fl. Madeira 71*; *Griseb. Fl. Br. W. Ind. 132* (excl. vars. β , γ); *Hook. f. Fl. Br. Ind. i. 514* (excl. vars. 2–4); *Bentl. & Trim. Med. Pl. t. 53*; *Hume Citrus t. 10*; *P. Wils. in N. Amer. Fl. xxv. 222*; *Swingle in Pl. Wils. Pt. 4, 141*. *C. tuberosa* Miller *Gard. Dict. ed. 8* (1768). *C. arbor et malus* &c. *Sloane Cat. 208 & Hist. ii. 176*. *C. fructu oblongo majori cortice crasso &c.* *Browne Hist. Jam. 309*.

Citron.

Cultivated; *Sloane Herb. vii. 112!* native of China, and possibly also of India.

Shrub or tree, 8–10 ft. high; trunk short, indistinct; branches armed with stout horizontal spines (often long), or sometimes unarmed. Flowers solitary or usually in short racemes of 3–10 flowers, the buds purplish. Calyx 3–4 mm. l., shallow, with 5 teeth. Petals 5, oblong, incurved at the tip, white within, usually tinged with purplish-pink outside, nearly 2 cm. l. Stamens about 40, irregular in length, nearly as long as the petals, usually united below into bundles of about 4 in each. Ovary 9–12-celled. Fruit more or less oblong in outline, often 2 dm. l., apex usually blunt (rarely nipple-shaped), style often persistent; surface rugged with both transverse and longitudinal furrows, or smooth and even; rind 3–7 cm. thick, a thin

outer layer full of vesicles of essential oil, and the white thick inner substance. Seeds ellipsoidal, plump, light-coloured, smooth.

The shrub is very sensitive to cold. The rind of the fruit is preserved.

2. C. Limonum *Risso* in *Ann. Mus. Paris* xx. 201 (1813); leaflet ovate-elliptical or oblong-elliptical, tapering to the apex, 5–14 cm. l., apex acute, margin serrulate; petiole with or without a linear margin or narrow oblanceolate wing, distinctly jointed with the leaflet; fruit oblong-ellipsoidal, sometimes somewhat obovoid, 6–10 cm. l., usually with a nipple-shaped apex, rind thin, pale yellow, pulp abundant, very juicy, acid, pale yellow.—*Risso Orang.* t. 70, 84; *Wright Mem.* 201; *Macf. in Hook. Bot. Misc.* i. 279 & *Jam.* i. 126; *Berg & Schmidt Off. Gew.* iv. t. 31, f.; *Bentl. & Trim. Med. Pl.* t. 54; *Hume Citrus* t. 11 & f. 30; *P. Wils. loc. cit.* *C. medica* var. *Limon L. Sp. Pl.* 782 (1753). *C. Limon Lun. Hort. Jam.* i. 451 (1814). *C. medica acida Tuss. Fl. Ant.* iii. t. 19 (1824). *C. medica* var. *Limonum Griseb. loc. cit.*; *Hook. f. tom. cit.* 515. *C. Limonia Osbeck Reise Ostind. China* 250 (1765) *fide Swingle tom. cit.* 146. *Limo arbor &c. Sloane Cat.* 209 & *Hist.* ii. 178. *Limon vulgaris Miller Gard. Dict. ed.* 8 (1768). *C. fructu ovato acido &c. Browne Hist. Jam.* 308.

Lemon.

Cultivated; native of India and China.

Shrub or tree, 10–20 ft. high; branches armed with spines in the leaf-axils. Flowers solitary, rarely 2 or 3 together, axillary; buds purplish. Calyx about 3 mm. l., shallow, with 4–5 spreading teeth, persistent. Petals 5, oblong, strongly reflexed, white within, tinged with purplish-pink outside, nearly 2 cm. l. Stamens 20–30(–35), nearly as long as the petals, usually united below into bundles of about 4. Ovary 7–10-celled. Fruit smooth, sometimes wrinkled, pitted over the oil-glands; colour light yellow. Seeds oval, pointed at one (micropylar) end, quite smooth.

3. C. aurantifolia *Swingle in Journ. Wash. Acad. Sc.* iii. 463 (1913); leaflet ovate-elliptical or ovate-lanceolate, 6–9 cm. l., crenulate, apex usually obtuse; petiole usually with a narrow oblanceolate wing; fruit subglobular or ellipsoidal, very fragrant, 3·5–6·5 cm. l., often with a nipple-shaped apex, rind very thin, smooth, pale yellow or greenish, pulp abundant, agreeably acid, greenish.—*C. lima Lun. loc. cit.*; *Macf. in Hook. Bot. Misc.* i. 300 & *Jam.* i. 127; *P. Wils. loc. cit.* *C. medica L. Sp. Pl.* 782 (1753) (in part); *Descourt. Fl. Ant.* i. t. 7; *Wright Mem.* 201. *C. limetta Wight Ic.* t. 958 (non *Risso*). *C. aurantium* var. *spinossima Griseb. loc. cit.* (1859). *C. limonellus Hassk. Cat. Hort. Bogor.* 217 (1844). *C. medica* var. *acida Hook. f. loc. cit.* & *in Bot. Mag.* t. 6745. *Limonellus* or *Limo tenuis Rumph. Amboin.* ii. 107, t. 29. *Malus arantia* *fructu limonis pusillo acidissimo Sloane Cat.* 211 & *Hist.* ii. 182. *C. fructu sphærico-ovato . . . acido Browne Hist. Jam.* 308. *Limonia aurantifolia Christmann in Linn. Pflanzensystem* i. 618 (1777).

Lime.

Cultivated and spontaneous; probably native of India.

Shrub or tree to 15 or 20 ft. high; branches armed with spines in the leaf-axils. Flowers axillary, solitary, or 2-10 in clusters or short racemes. Calyx with 4-5 acute teeth, about 4 mm. l. Petals 4-5, oblong-lanceolate, white or pale pink, 1-1·5 cm. l. Stamens about 25, united in a number of groups. Ovary 9-10-celled. Fruit, juice-cells small, slender, pointed. Seeds small, ellipsoidal, pointed.

This species forms a good fence when well pruned. The fruit is picked and used green before it is ripe. The juice is considered to be purer and superior to that of the lemon, and is looked upon as an indispensable addition to many dishes, and is also used in the laundry; it is the chief source of citric acid, so important in the dyeing industry, and is of considerable value from a medicinal point of view. The young fruits, or the rind only of older fruits, are preserved in sugar and are eaten as a sweet-meat to aid digestion.

Bonavia (Oranges &c. 80-89) considers that the "lima" of Ceylon, with large petiolar wings and warty thick-skinned fruit, is the wild form of the lime. This "lima" is the *Limo ventricosus* (Lemon Purrut) of Rumf (Amboin. ii. 102, t. 26, f. 1, probably f. 3 is only a smooth form of the same). The following forms given by Rumf, viz. *L. agrestis* (Lemon Papeda) ii. 104, t. 27, *L. ferus* (Lemon Swangi) ii. 106, t. 28, *L. aurarius* (Lemon Maas) ii. 109, t. 30, seem to be only forms of *L. ventricosus*; while in his *Limoneillus* or *Limo tenuis* (Lemon Nipis) ii. 107, t. 29, we have the form selected for cultivation, the "lime," with small petiolar wings and smooth pleasantly acid fruit. Even if this view be not accepted, Christmann certainly includes the common lime in his name *Limonia aurantifolia*.

4. C. Aurantium *L. Sp. Pl. 782* (1753) (in part); leaflet oblong-elliptical, with a faint characteristic scent, 7-14 cm. l., apex acute or somewhat acuminate, sometimes obtuse, margin entire or slightly crenulate-serrate; petiole usually with a narrow oblanceolate wing; fruit globular or somewhat flattened at top and bottom, 6-9 cm. in diam., usually with solid core, rind closely fitting, usually thin, smooth or slightly rough, pulp abundant, sweet and subacid, yellow or red (in blood-orange).—*Risso in Ann. Mus. Par. xx. 181* & *Orang. t. 3-29*; *Tussac Fl. Ant. iii. t. 14*; *Griseb. loc. cit.* (in part); *Hook. f. loc. cit.* (excl. vars.); *Bentl. & Trim. Med. Pl. t. 51*; *Hume Citrus t. 4 & f. 15*; *P. Wils. tom. cit. 223*; *Bonaria op. cit. 19*, t. 40-58. C. sinensis *Osbeck Dagbok Ostind. Resa 41* (1757) (name only) & *Reise Ostind. China 250* (1765), *fide Swingle op. cit. 148*. C. Aurantium var. dulcis *Wright Mem. 203*; *Macf. in Hook. Bot. Misc. i. 301* & *Jam. i. 128*. *Malus Aurantia sinensis Sloane Cat. 211* & *Hist. ii. 181*. C. fructu sphærico...dulci &c. *Browne Hist. Jam. 309*. Aurantium sinense *Miller Gard. Dict. ed. 8* (1768). Leaves of both *C. Aurantium L.* & *C. vulgaris* Risso are included on the same sheet in *Herb. Linn.* and named *Aurantium* by Linnaeus.

Orange.

Cultivated and spontaneous; native of China and Cochin-china.

Tree 20-30 ft. high; branches generally armed with short spines in the leaf-axils. Peduncles solitary, axillary, 1-6-flowered, generally shorter than the petiole. Flowers very fragrant, white. Calyx 3-4 mm. l., with 3-5

short broad acute teeth, persistent. *Petals* 5 (or 4), oblong, 1·2-2·2 cm. l., dotted with green on the outside, recurved. *Stamens* 20-25, unequal; filaments flattened, often united at the base in threes or fours, shorter than the petals. *Ovary* 8-11(-14) celled. *Fruit*, juice-cells spindle-shaped. *Seeds* oblong-ovoid, plano-convex, narrowed towards the attachment, with a short oblique beak at the apex, wrinkled more or less.

The Navel Orange with adventitious sections at the apex not completely covered by the outer rind, and with very few seeds, sometimes appears as a sport on trees in Jamaica (e.g. at Savoy), otherwise bearing ordinary oranges.

5. *C. vulgaris* *Risso* in *Ann. Mus. Par.* xx. 190 (1813); somewhat like *C. Aurantium*, but petiole broadly winged, leaflets with a strong and characteristic pleasant scent; fruit somewhat rougher, darker in colour, often nearly red, core becoming hollow, rind bitter, pungent, and strongly aromatic, coverings of sections bitter, pulp acid.—*Risso Orang.* t. 30-52; *Berg & Schmidt Off. Gew.* iv. t. 31e; *Bentl. & Trim. Med. Pl.* t. 50; *Bonavia Oranges* &c. 1, t. 1-18; *P. Wils. loc. cit.* *C. Aurantium* L. *Sp. Pl.* 782 (1753) (in part); *Swingle tom. cit.* 147. *C. bigaradia* *Loisel.* in *Duham. Arb. ed.* Nov. vii. 99 (1819); *Tussac tom. cit. t. 15.* *C. Aurantium* var. *amara* *Wright Mem.* 203. *C. Aurantium* var. *vulgaris* *Macf. loc. cit.* *C. Aurantium* var. *bigaradia* *Griseb. loc. cit.*; *Hook. f. loc. cit.* *Malus Aurantia vulgaris major* *Sleane Cat.* 210 & *Hist. ii.* 179. *C. fructu sphærico . . . acido &c.* *Browne Hist. Jam.* 308.

Seville Orange, Bigarade Orange, Bitter Orange.

Cultivated and spontaneous; native of China, Cochin-china, Malay Is., and possibly India.

Tree, much like *C. Aurantium*. Spines somewhat longer. Flowers rather larger and more strongly scented. Calyx more regularly 4-5-toothed. Petals 5(4), white, linear-oblong, conspicuously dotted with oil-cells. Fruit, juice-cells sometimes smaller than those of *C. Aurantium*. Seeds flattened, marked with ridged lines.

The leaves are preferred to those of the Orange by perfumers for distillation for essential oil. The pulp and rind of the fruit makes the best marmalade. The tree is resistant to foot-rot, and is therefore used as a stock on which to bud the Orange, Lemon, &c.

The Bitter-sweet or Seville-sweet Orange is a variety, the flavour of the juice being sweet and pleasantly flavoured.

6. *C. nobilis* *Lour. Fl. Cochin.* 466 (1790); leaflet lanceolate to elliptical, 5-10 cm. l., margin slightly crenulate; scent of leaves, fruit, &c. peculiar and characteristic; petiole short, not margined; fruit somewhat globular, or pear-shaped, more or less flattened or depressed at top and bottom, size variable, from smaller than the sweet orange to about the same size, rind more or less loose or baggy and easily removed, smooth or rough, colour orange to reddish, pulp abundant, orange-coloured to reddish, sweet and subacid with peculiar pleasant flavour, sections and their coverings easily separable.—*Ait. Hort. Kew. ed. 2, ir.* 420; *Andrews Bot. Rep.* t. 608; *Bot. Reg. t. 211;* *Forbes &*

Hemsl. in *Journ. Linn. Soc.* xxiii. 111; *Bonavia Oranges &c.* 44–59, t. 92–128; *Webber* in *Bailey's Cyclop. of Amer. Hort.* i. 323; *Hume* in *Bull. Florida Exp. St.* lxvi. 582, t. 1 (1903) & *Citrus* 17, t. 2, 5–8; *Taylor* in *Yearb. U.S. Dept. Agr.* 1907, 311–313, t. 34; *Swingle* in *Pl. Wils.* pt. 4, 142. *C. Aurantium* var. *sinensis* *L. Sp. Pl.* 783 (1753). *C. deliciosa* *Tenore* in *Ind. Sem. Hort. Bot. Neapol.* [9] (1840), & in *Atti R. Istit. Napoli* vii. 1, with tab. (1847). *C. nobilis* var. *deliciosa* *Swingle loc. cit.*

King Orange, Tangierine Orange, Mandarin Orange.
Cultivated; native of Cochin-china and China.

Tree 12–20 ft. high; branches with or without spines. Flowers solitary or in clusters of 3 or 4, terminal or axillary, white, sweet-scented, small, 2–2·5 cm. in diam. Petals 8–10 mm. l. Stamens 18–23, shorter than the petals, only slightly united. Ovary 9–15-celled. Fruit, juice-cells broad and blunt. Seeds top-shaped, beaked; cotyledons greenish.

Adventitious sections sometimes occur at the apex, especially in the large form, so well known at Poros, but they are enclosed by the rind, not exposed as in the Navel Orange.

C. nobilis is described by Loureyro as a tree without spines, ascending branches, lanceolate leaves, petiole without wings, peduncle terminal, with several flowers, fruit compressed-round, red inside and out, 5 inches in diam., rind thick, sweet, edible, very rough, pulp most pleasant of all citrus fruits, native of Cochin-china. Swingle is of the opinion that the "King Orange" introduced into the United States in 1880 from Saigon, Cochin-china, is this species (see Taylor's plate in Year-book), and that Wilson's specimen of a cultivated plant in China is also the same.

C. deliciosa is described and figured by Tenore as a tree armed with strong spines $\frac{1}{2}$ –2 inches long, leaves lanceolate, petiole without wings, flowers solitary, axillary, fruit strongly compressed, rind thin, pulp outside and inside of a yellow-orange colour, delicious to the taste. The figure of the fruit is $2\frac{1}{4}$ inches in diameter. Swingle (in *Pl. Wils.*) provisionally considers this to be a variety of *C. nobilis*, and to include the cultivated forms known as Tangierine and Mandarin Oranges; he says, however, that "better knowledge of this complex group may resolve it into several closely allied species."

7. *C. grandis* *Osbeck Dagbok Ostind.* Resa 98 (1757); leaflet elliptical to ovate-oblong, usually puberulous beneath on the midrib, especially when young, 10–20 cm. l., apex rounded or somewhat acuminate, sometimes emarginate, margin more or less crenulate; petiole broadly winged; fruit very large, globular or pear-shaped, 10–20 cm. l., light lemon or orange-coloured, rind thick, white, spongy, bitter, usually smooth, coverings of sections leathery, not continuous round the inner end so that the pulp projects into the open core, pulp inclined to be tough, acid and bitter with some sweetness; juice-cells large, distinct from one another.—*Swingle loc. cit.* 144. *C. decumana* *L. Syst. ed.* 12, 508 (1767); *Tussac Fl. Ant.* iii. t. 17, 18; *Descourt. Fl. Ant.* iii. t. 220; *Macf. in Hook. Bot. Misc.* i. 303 & *Jam.* i. 130; *Griseb. loc. cit.*; *Hook. f. loc. cit.* 516; *Hume Citrus* 51, 52, 127, f. 27; *P. Wils. loc. cit.* *C. Aurantium* var. *grandis* *L. Sp. Pl.* 783

(1753). *C. Aurantium* var. *decumana* *L.* *Sp. Pl. ed. 2*, 1101 (1763). *C. pompeiros* *Risso Orang. t.* 61–66 (1818). *Malus arantia* &c. *Sloane Cat. 212 & Hist. i. 41*, *t. 12, f. 2, 3, 4*. *C. fructu sphærico-obovato maximo* &c. *Browne Hist. Jam. 309*. *Limo decumanus* *Rumph. Amboin. ii. 96*, *t. 24, f. 2*. Specimen in Herb. Linn. named by Linnaeus.

Shaddock.

Cultivated and spontaneous; *Sloane Herb. vii. 113, 115!* native of China, Cochin-china, and Malay Islands.

Tree 12–20 ft. high; young shoots pubescent; spiny when young, becoming less so with age. *Flowers* large, white, sweet-scented, 3–9 in subterminal axillary racemes which are longer than the petiole; peduncle and pedicels puberulous. *Calyx* irregularly 4(–5)-toothed. *Petals* 4 (rarely 5), oblong, dotted with green on the outside. *Stamens* 30–35. *Ovary* 11–16-celled. *Fruit*, juice-cells spindle-shaped. “There are two varieties of shaddock. In var. *a. maliformis*, the fruit is globose, with the pulp of a pale pink colour, approaching to a very light yellow. In var. *b. pyriformis*, the fruit is more or less pear-shaped, the pulp is of a crimson colour more or less intense. The second of these varieties is the more esteemed, being sweet and juicy, and having only in a slight and palatable degree the acridity which abounds in the first” (Macfadyen).

8. *C. paradisi* *Macf. in Hook. Bot. Misc. i. 304* (1830) & *Jam. i. 131*; leaflet elliptical, rounded at both ends, glabrous, 7–10 cm. l., margin crenulate; petiole narrowly winged; fruit large, globular or pear-shaped, yellow, rind smooth, pulp pale yellow, flavour a pleasant mingling of sweet, acid and bitter, juice-cells tightly bound together.

Generally regarded as a variety of *C. decumana* *Lunan Hort. Jam. ii. 172*; *Hook. f. loc. cit.* (in part) (non *L.*); *Hume Citrus 43–50, 115–126, t. 9*; *P. Wils. loc. cit.* (in part). *Malus arantia* &c. *Sloane Cat. 212 & Hist. i. 41* (in part). *C. fructu sphærico-obovato minori* &c. *Browne Hist. Jam. 309*.

Grape Fruit, Forbidden Fruit, Pomelo.

Cultivated and spontaneous; *Sloane Herb. vii. 114!* *Distin!* probably a native of China.

Tree about 30 ft. high. *Spines* usually short, axillary. *Flowers* like those of *C. grandis* Osbeck, solitary or 2–6 in an axillary raceme. *Peduncle* glabrous, about 1 cm. l. *Calyx* irregularly 5-toothed. *Petals* 4, oblong. *Stamens* about 25.]

5. AMYRIS L.

Resinous, glabrous trees and shrubs. Leaves alternate, or opposite and alternate, 1–3-foliate or imparipinnate, leaflets opposite, with very numerous pellucid dots. Panicles with numerous flowers, axillary and terminal. Flowers small, white, often 3 together, hermaphrodite or polygamous. Floral parts in 4's. *Calyx* urceolate, 4-toothed, persistent. *Petals* 4, imbricate, spreading or bent down. *Stamens* 8. *Ovary* 1-celled; ovules 2, pendulous. *Drupe* small, aromatic, oily; putamen

chartaceous, 1-seeded. Cotyledons thick, plano-convex, dotted with glands; endosperm wanting.

Species 12, natives of the West Indies and of tropical America, north of the equator.

Leaves opposite, or rarely subopposite.

Ovary glabrous. Drupe globular, 5–8 mm. l..... 1. *A. Elemifera*.

Ovary puberulous. Drupe ellipsoidal, 6–14 mm. l. 2. *A. balsamifera*. Leaves alternate, or rarely subopposite 3. *A. Plumieri*.

1. *A. Elemifera* L. *Syst. ed.* 10, 1000 (1759); leaves opposite; leaflets 3, or on the same branch 3 and 5, 2–6(–7) cm. l.; ovary

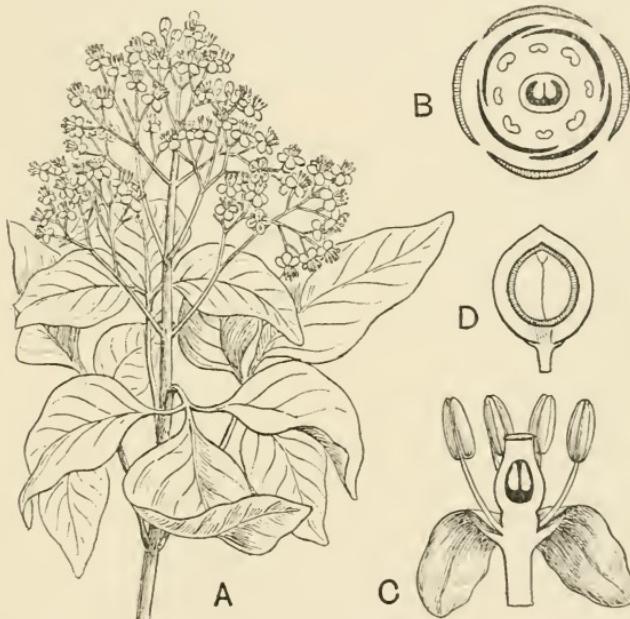


Fig. 60.—*Amyris Elemifera* L.

A, Male inflorescence and leaves $\times \frac{2}{3}$. C, Hermaphrodite flower cut lengthwise $\times 6$.

B, Hermaphrodite flower, diagram.

D, Drupe cut lengthwise $\times 2$.

(After Sargent.)

glabrous; drupe globular, 5–8 mm. l.—*Urb. in Engl. Jahrb.* xxii. 601; *P. Wils. in N. Amer. Fl.* xxv. 218. *A. maritima* Jacq. *Enum. Pl. Carib.* 19 (1760) & *Sel. Stirp. Amer.* 107; *Macf. Jam.* i. 231; *Griseb. Fl. Br. W. Ind.* 174 (in part); *Sarg. Silv. i.* 85, t. 36. *A. sylvatica* Jacq. *Sel. Stirp. Amer.* 107 (1763) & *Ed. pict.* t. 108; *Griseb. loc. cit.* (1859) (excl. syn. *Spreng.* and habitat *N. Grenada*). *Cytisus arboreus bituminosus* &c. *Sloane Cat.* 141 & *Hist. ii.* 33, t. 177. *Frutex trifolius resinosis*, *floribus tetrapetalis* &c. *Catesb. Car. ii.* 33, t. 33. (Fig. 60.) Specimen from Browne in *Herb. Linn.* named by Linnaeus.

Torch-wood.

Sloane Herb. vi. 4! *Browne*! St. Ann, *Purdie*! road to Wareka, 300 ft.; Comma Pen, 500 ft.; near Lititz; east of Rifle Range, Kingston, 200 ft.; Long Mt., 900 ft.; Lapland, 1800 ft.; Cane River valley, 250 ft.; Peckham, Clarendon, 2500 ft.; *Harris*! Fl. Jam. 6673, 7075, 7228, 8610, 8847, 9016, 9192, 10,063, 11,014.—Florida, Key West, Bahamas, Cuba, Hispaniola, Porto Rico, St. Thomas, St. Jan, St. Cruz, Guadeloupe, Les Saintes, Martinique, St. Lucia, St. Vincent, Becquia, Trinidad. The habitat Carthagena quoted by Jacquin is not confirmed by specimens.

Shrub or tree, 12–35 ft. high; twigs, inflorescence, and petioles glabrous. Leaflets lanceolate to broadly ovate or roundish, acute to long acuminate, cuneate to rounded at the base, crenulate or entire, thinly leathery. *Calyx* about .5 mm. l., with triangular lobes. *Petals* elliptical to obovate-elliptical, 2–3 mm. l., gland-dotted. *Gynophore* wanting or more or less developed.

The wood is heavy, exceedingly hard, strong, and close-grained; it is very resinous, extremely durable, and can be made to take a beautiful polish. A cubic foot of dry wood weighs about 65 lbs. If it could be obtained in large quantities, it would prove valuable (Sargent).

2. *A. balsamifera* L. *Syst. ed.* 10, 1000 (1759); leaves opposite; leaflets 5, or 5 and 3, 4–13 cm. l.; ovary puberulous; drupe ovoid-ellipsoidal or ellipsoidal, 12–14 mm. l.—*Macf. Jam. i.* 231; *Griseb. loc. cit.* (excl. syn. *Willd. & Kunth*); *Urb. tom. cit.* 292; *P. Wils. loc. cit.* *A. arboreus* foliis &c. *Browne Hist. Jam.* 208 (excl. syn. *Sloane*). *Toxicodendron arborescens* *Miller Gard. Dict. ed. 8* (1768). Specimen from Browne in *Herb. Linn.* named in Solander's hand.

Torch Wood, White or Black Candle Wood, Rose-wood. *Wright*! St. Ann; Bull Bay; *Browne*! Port Royal Mts, *Macfadyen*! *Distin*! Lime savanna, Clarendon, *Purdie*! *March*! Chester Vale; near Mount Lebanon, 3000 ft.; Grove, 900 ft.; Lapland, 1500 ft.; Peckham, Clarendon, 2500 ft.; Soho, St. Ann, 1400 ft.; *Harris*! Fl. Jam. 5553, 5913, 6693, 8423, 9172, 11,098, 11,992.—Florida, Cuba, Hispaniola, Mugeres Is., near Honduras, Colombia, Ecuador.

Tree (or *shrub*) 20–40 ft. high. Rhachis of *inflorescence* and *calyx* minutely puberulous or glabrate. Leaflets lanceolate to ovate, acute to long acuminate, cuneate at base, rarely obtuse, crenulate or entire. *Calyx* about .7 mm. l., with triangular-roundish lobes. *Petals* elliptical to obovate-elliptical, about 3 mm. l., gland-dotted.

Wood 2 or 3 ft. in diameter, hard, heavy, and close-grained, with aromatic smell. It takes a fine polish, and is considered valuable for cabinet work. It splits easily into strips, and burns readily with a fragrant smell, so that it is used by the peasantry for firewood and torches. Browne states that in his time it was considered one of the most valuable trees in the island.

3. *A. Plumieri DC. Prodr. ii.* 81 (1825) (excl. syn. *L.*); leaves alternate or rarely subopposite; leaflets 3, rarely 5, 5–7 (3–10) cm. l.; petals conspicuously gland-dotted; ovary glabrous; drupe globular, 4–7 mm. l.—*Griseb. loc. cit.* *A. sylvatica* *Macf. Jam. i.* 231 (non *Jacq.*); *Karst. Fl. Col. ii.* 109, t. 158, f. III.; *Urb. tom. cit.* 295; *P. Wils. tom. cit.* 219. *A. maritima* *Sw. Obs. Bot.* 148 (1791); *Baill. Hist. iv.* 397, f. 447–451 (non *Jacq.*). *Baccifera trifolia racemosa* &c. *Sloane Cat.* 170 & *Hist. ii.* 101.

Elemifera foliis ternatis &c. *Plum. Pl. Amer. (Bur.)* 87, t. 100.
Amyris fruticosus minor &c. *Browne Hist. Jam.* 209.

Candle-wood.

Sloane Herb. vii. 21! *Lane* in *Herb. Sloane* clxii. 223! Hills about the Ferry, *Browne*; *Wright*! *Masson*! *Anderson*! *Macfadyen*! *Waters*! Ocho Rios, *Purdie*! *March*! King's House grounds, J.P. 1113, *Hart*! Green Valley; J.P. 1275, *F. Campbell*! Ferry Pen, 150 ft.; Rio Cobre, 150 ft.; Constant Spring, 600 ft., *Campbell*! Robertsfield, 2000 ft.; near Sheldon; Green Valley; Berwick Hill, 2600 ft.; Watson's Hill, Manchester, 1000 ft.; Ferry River, 100 ft.; Ferry Pen, 50 ft.; *Harris*! Fl. Jam. 5194, 5234, 5278, 5279, 5312, 5789, 5790, 5927, 5990, 6249, 6319, 7714, 8630, 9052.—Hispaniola, Mexico, Costa Rica, Colombia.

Shrub 4–15 ft. high, glabrous. Leaflets roundish-ovate, or even somewhat roundish, or ovate, acuminate, acute or rounded at the apex, broadly wedge-shaped or rounded at the base, crenulate, crenate or doubly crenate, membranaceous to papery. Panicle usually terminal. Flowers white. Calyx about 6 mm. l., with roundish-triangular lobes. Petals elliptical to obovate-elliptical, 2·5–3 mm. l.

6. SPATHELIA L.

Trees with a simple slender unbranched trunk. Leaves alternate, pinnate with an odd leaflet, borne at the summit of the trunk, leaving conspicuous leaf-scars on falling; leaflets in many pairs, opposite or alternate, with pellucid dots on the margin. Panicles very large, terminal. Flowers polygamous. Calyx 5-cleft; segments spreading, valvate or subvalvate. Petals 5, imbricate. Stamens 5, free. Ovary 3-angled, 3-celled, sterile in the male flowers; style very short, deciduous with the 3 obovate-roundish fleshy papillose stigmas, rudimentary in male flowers; ovules one in each cell, pendulous from the inner angle at the apex. Drupe 3-sided, 3-winged (rarely 2-sided, 2-winged, 2-celled); putamen 3-angled, 3-celled, with resin-canals, cells 1-seeded. Seeds with thickish endosperm; cotyledons linear-oblong. The tree dies after maturing fruit, that is, about six months after flowering.

In the few female flowers which are available for dissection, we find only one ovule which is pendulous from the inner angle at the apex of each ovary-cell. *Bentham* and *Hooker*, who describe the ovules as geminate in each cell, place this genus in *Simarubaceæ*; *Engler* places it in *Rutaceæ*.

Mountain Pride.

Species 5, natives of Jamaica and Cuba—one of the Cuban species is found also in the Bahamas.

Leaflets velvety beneath. Filaments with hairy wings 1. *S. sorbifolia*. Leaflets glabrous. Filaments without wings 2. *S. glabrescens*.

1. *S. sorbifolia* L. *Amœn. v.* 377 (1760); leaflets velvety on both sides, especially on the midrib, sometimes glabrate on the upper surface; filaments with hirtellous wing-like appendages on

the lower half.—*S. simplex L.* *Sp. Pl. ed. 2*, 386 (1762); *Gaertn. Fruct. i.* 278, *t.* 58; *Willd. Sp. Pl. i.* 1496; *Hort. Kew. ed. 2, ii.* 171; *Lun. Hort. Jam. i.* 524; *Bot. Reg. t.* 670; *Macf. Jam. i.* 234; *Planch. in Hook. Lond. Journ. Bot. v.* 581; *Griseb. Fl. Br. W. Ind.* 140 (excl. syn. *S. glabrescens*); *P. Wils. in N. Amer. Fl. xxv.* 208, & in *Torreya xi.* 263. Aceri aut paliuro affinis arbor caudice non ramoso, foliis sorbi, &c. *Sloane Cat.* 138 & *Hist. ii.*

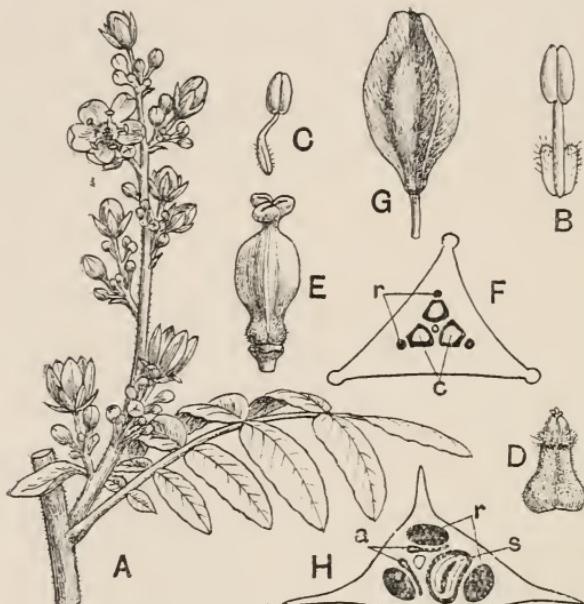


Fig. 61.—*Spathelia sorbifolia* L.

- A, Small portion of inflorescence with a small leaf $\times \frac{1}{2}$.
- B, Stamen $\times 3$.
- C, Stamen of *S. glabrescens* $\times 3$.
- D, A sterile pistil of male flowers $\times 5$.
- E, Fertile pistil of hermaphrodite flower $\times 3$.

- F, A cross-section of same $\times 5$; *r*, resin-canals; *c*, cells with ovules.
- G, Fruit $\times \frac{1}{2}$.
- H, A cross-section of same $\times 2$; *r*, resin-canals; *a*, abortive cells; *s*, seed.

(A after Bot. Reg.; B, C, after P. Wilson.)

28, *t.* 171. Spathe caudice simplici, fronde pinnata comosa, racemo spatioissimo laxo terminali *Browne Hist. Jam.* 187. *Rev. J. Lindsay Ic. ined.*

Hope river, Liguanea, *Sloane Herb. v.* 101, 102! *Browne*; *Shakspear!* *Purdie!* *March*; Hope, *Campbell!* hillsides, Gordon Town, *Britton*, 1! also *Harris!* *Fl. Jam.* 6421, 9375.

Tree, 20–25 ft. high, diameter 3 inches near the base. *Leaves* 4–10(–15) dm. l.; rhachis velvety; leaflets 45–81, alternate, subopposite, oblong, sessile, 2 cm.–2 dm. l., 1–4 cm. br., coarsely crenulate with a gland at the tip of each crenature, truncate to subcordate at the base, apex acuminate, sometimes rounded. *Panicle* very large, to 18 dm. high, and 24 dm. in diam., branches velvety. *Sepals* elliptical to obovate-elliptical, glandular

at the apex, 3-3.5 mm. l. Petals elliptical, glandular at apex, 5-6 mm. l. Drupe 2-3 cm. l.

Linnaeus (Sp. Pl. ed. 2) quotes incorrectly from Browne "racemo simplicissimo" instead of "spatiosissimo."

2. *S. glabrescens* *Planch. in Hook. Lond. Journ. Bot. v. 581* (1846); leaflets glabrous on both sides; filaments with rudimentary basal appendages or none.—*P. Wils. in N. Amer. Fl. 207 & in Torreya xi.* 263.

Swartz! *Distin!* *Wilson!* *Moneague, Prior!* *Radnor, Stephens!* Stanmore Hill, Malvern, 2400 ft.; near Troy, 2200 ft.; Luana Point; *Harris!* Fl. Jam. 8482, 9659, 9822.

Tree, 50-70 ft. high, diameter 9 inches near the base. *Leaves* 5.5-11 dm. l., rhachis velvety or glabrate; leaflets oblong to oblong-lanceolate, 7-15 cm. l., with a short petiolule or subsessile, apex obtuse to acuminate, base obtuse, or truncate, sometimes more or less cordate, margin coarsely crenate to entire. *Panicle* large, branches glabrous or velvety. *Sepals* oblong-elliptical to oblong-lanceolate, glandular at apex, 4-5 mm. l. *Petals* 5-9 mm. l. *Drupe* 2-3 cm. l.

Ruta chalapensis L. (*R. graveolens* Lun. *Hort. Jam. ii.* 128, non L.) is noted by P. Wilson (in N. Amer. Fl. xxv. 212) as introduced from the Old World into Central America, Jamaica, and other W. Indian Islands, but we have not seen any evidence that it is naturalized.

FAMILY XLVI. SIMARUBACEÆ.

Shrubs or trees. Leaves alternate, rarely opposite, pinnate, rarely 1-3-foliolate or simple; stipules none. Inflorescence axillary in most, paniculate or racemose. Flowers small, diclinous or polygamous. Calyx with 3-5 lobes or segments. Petals 3-5. Stamens inserted at the base of the disk, as many or twice as many as the petals; anthers introrse, with longitudinal dehiscence. Ovary 2-5-lobed, 1-5-celled, or 3-5 free carpels; styles 2-5. Ovules solitary in the cells (2 in *Picramnia* and *Alvaradoa*), attached at the inner angle. Seeds solitary, pendulous (erect in *Suriana* and *Alvaradoa*). Endosperm wanting. Cotyledons plano-convex.

Species about 150, natives mostly of the warmer regions of the world.

Leaves simple.

- | | |
|-----------------------------|---------------------|
| Flowers hermaphrodite | 1. <i>Suriana</i> . |
| Flowers unisexual | 2. <i>Castela</i> . |

Leaves compound.

Ovary lobed.

- | | |
|-----------------------|----------------------|
| Ovary 5-cleft | 3. <i>Simaruba</i> . |
| Ovary 2-3-lobed | 4. <i>Picraena</i> . |

Ovary entire.

- | | |
|---|-----------------------|
| Inflorescence opposite the leaves | 5. <i>Picramnia</i> . |
| Inflorescence axillary | 6. <i>Alvaradoa</i> . |

1. SURIANA L.

Sea-shore shrub, covered with capitellate mixed with simple hairs. Leaves alternate, clustered together, simple, linear-spathulate, thick, without stipules. Flowers subterminal, hidden by the leaves, solitary or few in a raceme, yellow, hermaphrodite. Calyx 5-cleft, imbricate, persistent. Petals 5, as long as the calyx, imbricate. Stamens 10, hypogynous, the 5 opposite the petals shorter and sometimes without anthers. Ovary of 5 distinct carpels, the styles springing from near the base, free. Ovules 2 in each cell, ascending from the base. Ripe carpels 3–5, surrounded by the calyx, 1-seeded; endocarp hard and brittle. Seeds ascending. Embryo horseshoe-shaped; cotyledons flattish; radicle long, superior, descending to the hilum.

Species 1, found on all tropical sea-shores.

S. maritima L. *Sp. Pl.* 284 (1753); *Jacq. Sel. Stirp. Amer.* 140; *Sw. Obs. Bot.* 185; *Macf. Jam.* i. 235; *Griseb. Fl. Br. W. Ind.* 58; *Engl. in Fl. Bras.* xii. pt. 2, 202; *Urb. Symb. Ant.* iv. 321; *Engl. in Engl.-Prantl Pflzfam.* iii. pt. 4, 208, f. 119; *P. Wils. in N. Amer. Fl.* xxv. 225; *Guppy Plants &c. W. Indies,*

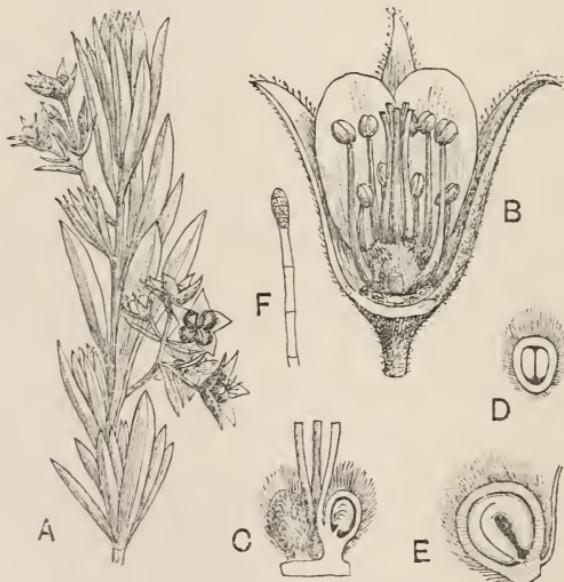


Fig. 62.—*Suriana maritima* L.

- A, Portion of branch with inflorescence and leaves $\times \frac{2}{3}$.
 B, Flower with part of the calyx and corolla and one stamen removed $\times 4$.
 C, Pistil cut lengthwise $\times 6$.
 D, One of the carpels cut across $\times 6$.
 E, Ripe nutlet cut lengthwise $\times 2$.
 F, Hair from calyx enlarged.
 (A, C, D, E after Engl.)

239. *S. foliis &c. Plum. Gen.* 37, *t. 40.* *S. maritima &c. Browne Hist. Jam.* 190. *Thymelæe facie frutex &c. Sloane Cat.* 138 & *Hist. ii.* 29, *t. 162, f. 4.* (Fig. 62.) Specimen in Herb. Sloane in Herb. Mus. Brit. There are two specimens in Herb. Linn., one named by Linnaeus, the other from Browne named in Solander's hand.

House Key, near Port Royal; St. Ann; Sloane Herb. v. 105! St. James, Browne! Shaksppear! Plantain Garden river, Macfadyen; Mam mee Bay, St. Ann, McNab! Prior; March! Dover, Metcalfe! Port Henderson, Campbell! sea-shore, Healthshire Hills; Pedro Bluff; Harris! Fl. Jam. 6069, 9526, 9717.

Shrub or small tree, 4-10(-20) ft. high. Leaves 1-3·5 cm. l. Bracts lanceolate, 3-4 mm. l. Sepals ovate-lanceolate, 8 (6-10) mm. l. Petals rectangular-elliptical, with erose apex, shortly clawed, shorter than the calyx. Filaments villose at the base. Ovary villose. Ripe carpels pubescent, 5 mm. l.

2. CASTELA Turpin.

Shrubs; branches often reduced to spines. Leaves alternate, simple, entire, leathery. Flowers small, inconspicuous, clustered or solitary in the axils, dicoccous. Calyx small, 4-cleft. Petals 4, imbricate. Disk fleshy, crenate. Male flowers: Stamens 8. Ovary wanting. Female flowers: Staminodes 8. Ovary com-

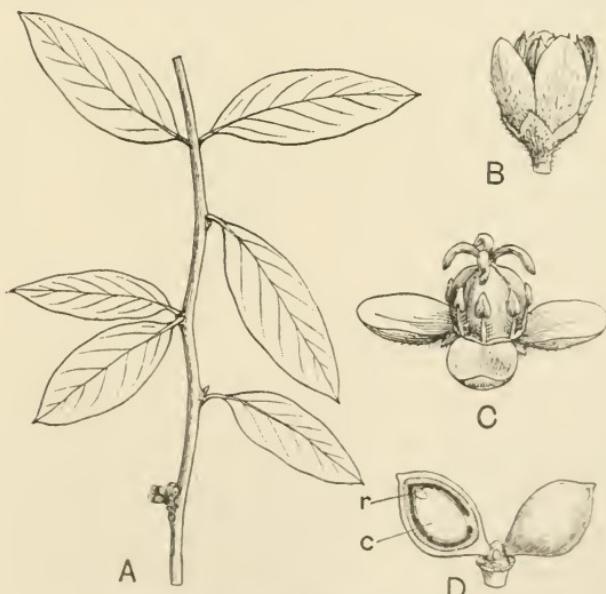


Fig. 63.—*Castela macrophylla* Urb.

A, Portion of branch showing leaves and male flowers $\times \frac{1}{2}$; the leaves above the lowest spring from reduced axillary shoots.
B, Male flower $\times 4$.

C, Female flower $\times 4$ of *C. Nicholsoni* Hook.
D, Drupes, one cut lengthwise, nat. size; c, cotyledon; r, radicle.

(C after Hooker.)

posed of 4 carpels cohering at the apex; styles 4, short, united below, recurved and stigmatic above; ovules solitary in each cell. Drupes 1-4, fleshy; endocarp hard, brittle. Seed attached laterally at the middle or near the base (*C. macrophylla*) of the cell; endosperm scanty or wanting (*C. macrophylla*); cotyledons thick, plano-convex.

Species 11, natives of Central America, tropical S. America, and Jamaica.

C. macrophylla *Urb.* *Symb. Ant.* v. 377 (1908). *Castelaria macrophylla* *Small in N. Amer. Fl.* xxv. 232 (1911). (Fig. 63.)

Long Mountain, 900 ft.; common on Great Goat Is.; hill behind Ferry Quarry, 200 ft.; *Harris!* *Fl. Jam.* 9219, 9347, 9348, 10,047; Little Goat Is., *Britton & Hollick*, 1843!

Shrub 2-8 ft. high; spines, when present, axillary, 2-3 mm. l. Leaves narrowly or broadly elliptical, sometimes oblanceolate, 2-6 cm. l.; nerves and veins slightly prominent, reticulate, glabrous on the upper surface, minutely puberulous beneath. Flowers subsessile; male, several on very short reduced axillary shoots; female, 2-4, axillary or on a short axillary branch; pedicels 2-3 mm. l. in fruit. Calyx about .7 mm. l., hairy. Petals pink, elliptical, concave, 3 mm. l. Drupe bright scarlet, ellipsoidal-compressed, shortly beaked at the apex, 1-1.5 cm. l.

3. SIMARUBA Aubl.

Trees. Leaves alternate, pinnate with or without an odd leaflet; leaflets mostly alternate, entire. Panicles axillary and terminal. Flowers small, diœcious or monœcious. Calyx 5-lobed. Petals 5, imbricate. Disk villose. Male flowers: Stamens 10, inserted at the base of the disk, included; filaments with a short scale at the base inside. Female flowers: Staminodes scale-like. Ovary 5-cleft; styles united; stigmas spreading or recurved. Ovules solitary. Drupes 1-5, on the enlarged receptacle. Cotyledons fleshy.

Species 6, natives of tropical eastern America and the West Indies.

S. glauca *DC. Ann. Mus. Par.* xvii. 424 (1811); *Planch. in Hook. Lond. Journ. Bot.* v. 567; *Griseb. Fl. Br. W. Ind.* 139; *Engl. in Fl. Bras.* xii. pt. 2, 224; *Sarg. Silv. i.* 91, t. 38, 39; *Small in N. Amer. Fl.* xxr. 228. *S. officinalis* *Macf. Jam.* i. 198 (non *DC.*); *Urb. in Engl. Jahrb.* xv. 304, 306. *S. medicinalis* *Endl. Medic. Pfl.* 528 (1842); *Berg & Schmidt Off. Gew.* ii. t. 13, f. Quassia Simaruba *Wright in Trans. R. Soc. Edinb.* 73, t. (1790), reprinted in *Mem.* 308 (non *Linn. f.*). (Fig. 64.)

Bitter Damson, Bitter Dan, Mountain Damson, Stave Wood.

Wright! Macfadyen! St. Mary, *McNab!* *Prior!* *March!* Mavis Bank, J.P. 1053, 1286, *Hart!* Robertsfield, 2000 ft.; near Troy, 1400-2000 ft.;

Hope; Harris! Fl. Jam. 5981, 8664, 9358, 9551—Bahamas, Hispaniola, Central America, Florida.

Tree 20-30(-50) ft. high. *Leaflets* 9-19, oblong-elliptical or oblong, puberulous beneath or glabrous, 4-10 cm. l., apex rounded, sometimes subemarginate or obtusely apiculate, base wedge-shaped; veins distinct beneath, lateral parallel connected reticulately. *Panicles* ample, its short branchlets with few flowers; pedicels short, 1-3.5 mm. l. *Calyx* 1.3 mm. l., lobes semi-orbicular, minutely ciliolate. *Petals* greenish-yellow, oblong-elliptical, 5-6 mm. l., apex acute or shortly acuminate. *Stamens*, scales villose; anthers linear-oblong, 1.3-1.8 mm. l. *Drupe* ellipsoidal, dark purple, about 1.5 cm. l.

The wood is light and soft, and is of little value.

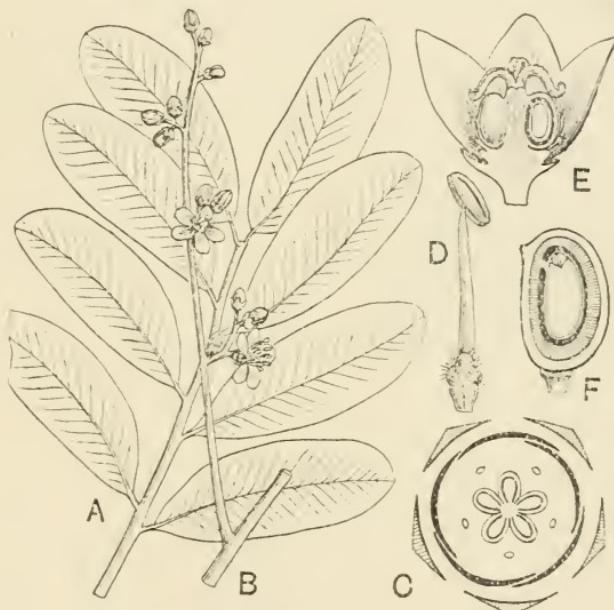


Fig. 64.—*Simaruba glauca* DC.

A, Portion of leaf, nat. size.

D, Stamen, enlarged.

B, Portion of male inflorescence $\times \frac{2}{3}$.

E, Female flower cut lengthwise $\times 4$.

C, Female flower, diagram.

F, Drupe with seed cut lengthwise, nat. size.

(A, B, C, E after Sargent.)

S. amara Aubl. (*Quassia Simaruba* Linn. f. Suppl. 234) occurs in some of the West Indian Islands, but is wrongly stated by Linnaeus fil. to be a native of Jamaica. The drupe of this species is about the same size as that of *S. glauca*, and more regular in form, not so compressed and acute on the ventral side.

Quassia amara Linn. fil. is noted by Planchon (Hook. Lond. Journ. Bot. v. 562) as sent from Jamaica by Distin, but it is an introduced plant from tropical S. America. It is readily recognised by the large crimson corolla (3 cm. l.), and the winged petiole.

4. PICRÆNA Lindl.

Trees with bitter juice. Leaves alternate, pinnate with an odd leaflet; leaflets opposite, entire. Panicles axillary, corymbose. Flowers greenish, polygamous. Sepals small, 4 or 5. Petals 4 or 5, subvalvate, not increasing in size after flowering. Disk saucer-shaped in the male flower, rounded, 4-5-lobed in hermaphrodite flowers. Stamens 4 or 5, inserted under the disk. Ovary 2-3-lobed, lobes free; styles 2 or 3, united below, free above; ovules solitary in each cell. Drupes 1-3, subfleshy, endocarp hard and brittle. Embryo undivided.

Species 3 or 4, natives of tropical America.

P. excelsa Lindl. *Fl. Med.* 208 (1838); *Griseb. Fl. Br. W. Ind.* 140 (excl. Antigua, St. Vincent); *Engl. in Fl. Bras.* xii. pt. 2, 228 (in part); *Bentl. & Trim. Med. Pl. t. 57* (excl. reference

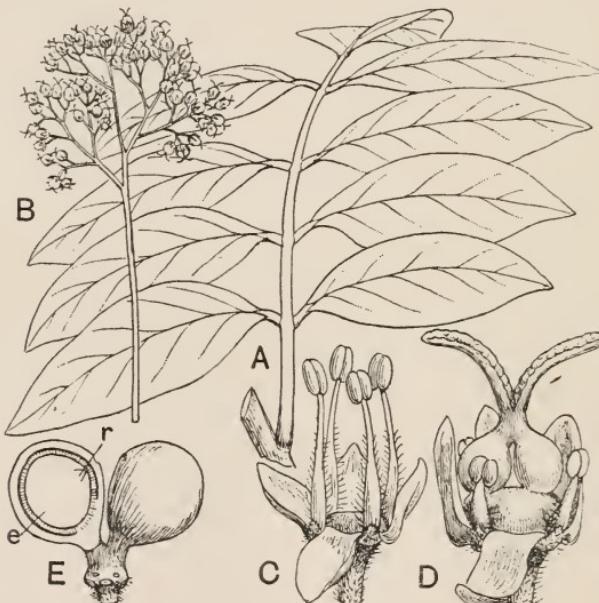


Fig. 65.—*Picraena excelsa* Lindl.

A, Leaf $\times \frac{1}{2}$.

B, Fertile inflorescence $\times \frac{1}{2}$.

C, Male flower $\times 5$.

D, Fertile flower $\times 5$.

E, Fruit, one drupe cut lengthwise $\times 2$; e, embryo; r, radicle.

to other islands and figs. 9, 10). *Picrania amara* Wright in *London Medical Journ.* viii. 275 (1787) & Mem. 90, 229 (without description). *Quassia excelsa* Sw. *Prod.* 67 (1788), in *Vet. Handl. Stockh.* ix. 302, t. 8 (1788), & *Fl. Ind. Occ.* 742 (excl. habitat Carib.). *Q. polygama* Lindsay *Trans. R. Soc. Edinb.* iii. 205, t. 6 (1794). *Simaruba excelsa* DC. *Ann. Mus. Par.* xvii. 424 (1811).

(excl. hab. Carib.); *Macf. Jam.* i. 198. *Picrasma excelsa* *Planch.* in *Hook. Lond. Journ. Bot.* v. 574 (1846) (excl. Antigua); *Engl. in Engl.-Prantl Pflzsm.* iii. pt. 4, 222, f. 129, a-g; *Urb. Symb. Ant.* v. 378. *Æschriion excelsa* *Kuntze Rev. Gen. Pl.* i. 103 (1891); *Small* in *N. Amer. Fl.* xxv. 233. *Æ.* *excelsa* var. *microcarpa* *Kr.* & *Urb.* in *Engl. Bot. Jahrb.* xv. 306 (1892). (Fig. 65.)

Bitter Wood, Jamaica Quassia.

Wright! *Macfadyen!* *McNab!* Shafton, Westmoreland; Guys Hill, St. Mary; *Purdie!* Moneague, *Prior!* March! Old England, Blue Mts.; Gordon Town; Hope, 700 ft.; near St. Ann's Bay; *Harris!* Fl. Jam. 5458, 7017, 9984, 10,363.—Hispaniola.

Tree 40–60(–80) ft. high. Leaflets narrowly elliptical or oblong-elliptical, unequal-sided, mostly cuneate or acute at the base, 5–12 cm. l. Panicles with long peduncles. Flowers greenish. Sepals 6–7 mm. l. Petals of male flower oblong-elliptical, 2 mm. l.; of hermaphrodite flower oblong-lanceolate, 3 mm. l. Stamens about 4 mm. l. in the male flower, 2–2·5 mm. l. in the hermaphrodite flower. Drupes globular or ovoid-globular, black, 6–7 mm. l.

The wood is largely exported from Jamaica, and is the “quassia” of commerce. Locally the wood is used for ceilings, bedsteads, and presses, as it is objectionable to insects. Quassia wood is a pure bitter tonic and stomachic. It is a valuable remedy in atonic dyspepsia, in debility, and in convalescence after acute diseases. “Bitter Cups” are manufactured from the wood. The wood is sometimes used by brewers as a substitute for hops. (Bentley and Trimen.)

Note to *Picrania amara* in “Medicinal Plants in Jamaica” by Dr. Wm. Wright in London Medical Journal viii. 275 (1787) by the editor, Dr. S. F. Simmons:—

In 1772 Dr. Wright discovered the tree which yields the simarouba of the shops, and the year following sent a botanical account of it to the late Prof. Hope at Edinburgh, under the title of *Quassia Simarouba*. At the same time he sent specimens of it to the late Dr. Fothergill, who transmitted them to the celebrated Linnæus at Upsal. The latter communicated this discovery to Prof. Murray at Göttingen, who has mentioned it in the third volume of his *Apparatus Med.* p. 458 (German edition, Arzneyvorrrath iii. 522).

P. antillana (*Rhus antillana* Eggars Fl. St. Croix and Virgin Is. 41 (1879); *Picrasma antillana* Urb. Symb. Ant. v. 378 (1908)), Bitter Ash, of the lesser Antilles, included by Swartz and other authors in the above species, has drupes about 1 cm. l., and leaflets with obtuse or rounded base.

5. PICRAMNIA Sw.

Shrubs or trees, often intensely bitter. Leaves alternate, pinnate with an odd leaflet; leaflets usually alternate. Spikes or racemes opposite the leaves, pendulous. Flowers diœcious, sometimes polygamous, small, in clusters, racemes, or panicles. Calyx 3–5-cleft, imbricate. Petals 3–5, rarely none, narrow, imbricate. Stamens of the male flower 3–5, opposite the petals, inserted under the disk; of the female flower reduced to linear staminodes. Pistil generally wanting in the male flowers. Ovary 2–3-celled; style short, 2–3-cleft. Ovules 2, collateral, near the apex of the cells. Berry 1–2-celled, cells 1-seeded. Embryo undivided.

Species about 25, natives of tropical America, including the West Indies.

- Floral parts in 3's..... 1. *P. Antidesma*.
Floral parts in 5's..... 2. *P. pentandra*.

1. *P. Antidesma* Sw. *Prodr.* 27 (1788); parts of the flowers in 3's; clusters of flowers in racemes, simple or 2-branched near the base, usually longer than the leaves.—*Sw. Fl. Ind.*

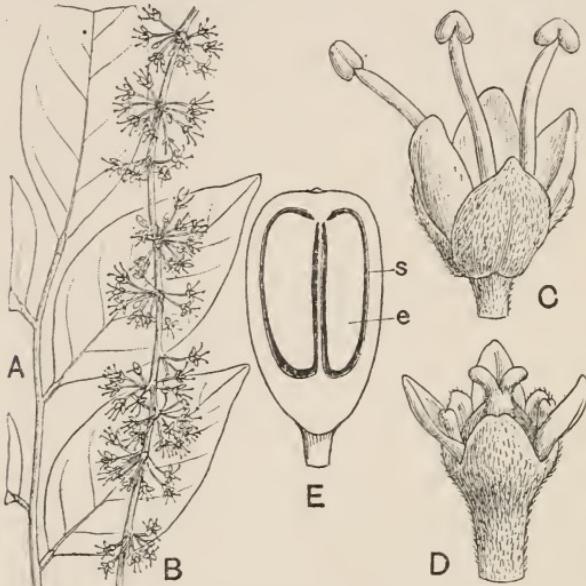


Fig. 66.—*Picramnia Antidesma* Sw.

A, Portion of leaf $\times \frac{2}{3}$.

B, Portion of inflorescence $\times \frac{2}{3}$.

C, Male flower $\times 10$.

D, Female flower $\times 10$.

E, Berry $\times 2$; s, seed; e, embryo.

Occ. 218, t. 4; *Macf. Jam. i. 224*; *Planch. in Hook. Lond. Journ. Bot. v. 578*; *Griseb. Fl. Br. W. Ind. 141*; *Small in N. Amer. Fl. xxv. 236*. *P. triandra* *Stokes Mat. Med. iv. 535 (1812)*. *Berberis fructu fruticoso &c.* *Sloane Cat. 170 & Hist. ii. 101, t. 208, f. 2*. *Antidesma &c.* *Browne Hist. Jam. 123*. *Cicca macrostachya* *Benth. Bot. Voy. Sulph. 166 (1844)*. (Fig. 66.) There is a specimen from Jamaica from Swartz in *Herb. Mus. Brit.*

Majoe Bitter, Macary Bitter.

Between St. Jago de la Vega and Passage Fort; Angels; *Sloane Herb. vii. 22* (& opp. 21)! *Broughton!* *Swartz!* *Macfadyen!* *Distin!* Great Valley, Manchester, *Purdie!* *Prior!* *March!* Silver Hill: Mt. Diablo; Mona woodland, 600 ft.; Long Mountain, 900 ft.; Stanmore Hill, Malvern, 2400 ft.; between Hardware Gap and Rose Hill, 3700 ft.; *Harris!* *Fl. Jam. 5484, 7028, 8855, 9058, 9754, 9770, 9949, 10,136*; Union Hill, Moneague, *Britton and Hollick*, 2801!—Central America. Swartz gives Hispaniola also, as a habitat.

Shrub or tree, 6-15 ft. high. *Leaflets* 5-9 or more, lanceolate-elliptical to ovate-lanceolate, acuminate, usually unequal-sided, glabrous, 5-10 (2-5-12) cm. l. *Inflorescence* puberulous or glabrescent. *Male flowers*: *Calyx* 3-cleft, 1.5-1.7 mm. l.; segments ovate, acute. *Petals* 3, greenish-yellow, ovoid, somewhat longer than the calyx. *Stamens* 3, about 3 mm. l. *Female flowers*: *Calyx* 3-cleft, about 1 mm. l.; segments elliptical, obtuse. *Petals* 3, oblong or oblong-elliptical. *Style* 2-cleft. *Berries* obovate-globular, 12-14 mm. l., scarlet, at length black.

"This shrubby tree affords a bitter less intense than that of the Quassia or Simaruba [*Picraea excelsa*], but much more grateful . . . The bark has been given with success as an alterative in constitutional affections, connected with syphilis and yaws, and as a tonic in debility of the digestive organs, and in intermittent fever" (Macfadyen).

2. *P. pentandra* Sw. *Fl. Ind. Occ.* 220 (1797); parts of the flowers in 5's, clusters of flowers on a panicle with several branches, usually shorter than the leaves.—*Rich. in Sagra Cub. x. 156, t. 36 bis; Planch. tom. cit. 577; Griseb. op. cit. 140; Small tom. cit. 237.* *P. micrantha* Tul. *Ann. Sc. Nat. sér. 3, vii. 262* (1847). *P. antidesmoides* Griseb. loc. cit.

"Crescit in Jamaica (Herb. Mus. Reg. Par.—Specim. ex Herb. cl. Hook. deprompto)." Tul. loc. cit.—Florida, Bahamas, West Indies.

Shrub or small *tree*, puberulous on the younger parts. *Leaflets* 5-9, elliptical or lanceolate, acuminate, often somewhat unequal-sided, glabrous, 5-10 (3-12) cm. l. *Inflorescence* puberulous with yellow hairs. *Male flowers*: *Calyx* 5-cleft, about 2 mm. l.; segments oblong, toothed above and passing into a more or less acuminate or acute apex. *Petals* 5, linear-lanceolate, 2-2.5 mm. l., sometimes slightly denticulate near the apex. *Stamens* 5, about 3 mm. l. *Female flowers*: *Calyx* 5-cleft, about 1 mm. l.; segments ovate, acute. *Petals* 5, linear, a little longer than the calyx. *Style* 2-cleft. *Berry* ellipsoidal, 10-13 mm. l., reddish-brown.

We have not seen a specimen from Jamaica, but, judging from the distribution, there is every reason to suppose it occurs.

6. ALVARADOA Liebm.

Shrubs or small trees, with bitter juice. Leaves alternate, imparipinnate; leaflets alternate. Racemes axillary and terminal, many-flowered. Flowers very small, tomentose, diœcious. Calyx 5-cleft, valvate. Petals 5, filiform, or wanting. Male flowers: Petals 5, filiform (in *A. amorphoides*). Disk large, deeply 5-lobed. Stamens 5, alternate with the lobes of the calyx, inserted between the lobes of the disk; anthers 2-celled, connective thickened, dorsal. Female flowers: Petals 5, stamens wanting. Ovary 2-3-celled, one cell only fertile; styles 2-3; ovules 2 in the fertile cell, erect from the base of the partition wall. Capsule very compressed or 2-3-winged, 2-3-celled; cells 1-seeded. Seed one, erect, compressed, without endosperm. Embryo broadly oblong, compressed. Cotyledons flat, foliaceous, fleshy. Radicle inferior.

Species 4, one a native of Central America, Florida, the Bahamas, and Cuba, one of Hispaniola, one of Cuba, and the fourth of Jamaica.

Fig. 67.—*Alvaradoa*.

- A, Portion of branch of *A. jamaicensis* Benth. with leaves and raceme of capsules $\times \frac{1}{2}$.
 B, Diagram of male flower.
 C, Male flower of *A. amorphoides* Liebm. $\times 6$.
 D, Female flower of ditto $\times 4$.
 E, Capsule of *A. jamaicensis*, nat. size.
 F, Ditto cut open to show seed $\times 2$.
 G, Embryo of ditto $\times 4$.
 H, Seed of ditto cut lengthwise $\times 4$.

A. jamaicensis Benth. *Pl. Hartw.* 344 (1857); *Griseb. Fl. Br. W. Ind.* 141; *Urb. Symb. Ant.* v. 379, f. 5; *Small in N. Amer. Fl.* xxv. 239.

St. Ann, Purdie! Union Hill, Moneague, 2000 ft., Prior! March; Schwallenburgh, St. Ann, 2200 ft.; Mount Diablo; Holly Mount, 2600 ft.; road to Holly Mount, 2000 ft.; Harris! Fl. Jam., 7037, 8493, 8903, 8982.

Shrub or small slender tree, 3-25 ft. high. Leaves, 1-2 dm. l. Leaflets, 15-45, leathery, oblong or oblong-elliptical, 1-3.5 cm. l., gradually becoming smaller towards the base of the rachis, glabrous, apex emarginate, lower surface lighter-coloured, margin revolute. Stamens twice as long as calyx (fide Grisebach). Capsules ovate-roundish, glabrous. Flowers not seen.

FAMILY XLVII. BURSERACEÆ.

Trees or shrubs. Leaves alternate, without stipules, simple or imparipinnate; leaflets opposite. Flowers racemose or paniculate, hermaphrodite or polygamo-dioecious. Calyx 3-6-lobed. Petals 3-6, deciduous. Disk free or adnate with the tube of the calyx. Stamens generally twice as many as the petals, inserted on the disk. Ovary 2-5-celled. Ovules 2 in each cell, attached near the apex at the interior angle of the cell. Fruit drupaceous. Seeds without endosperm. Cotyledons contortuplicate; radicle superior.

Species 400 or more, natives of the tropics.

- | | |
|--|---------------------|
| Ovary 3-celled; stigma 3-lobed..... | 1. <i>Bursera</i> . |
| Ovary 4-5-celled; stigma 4-5-lobed | 2. <i>Protium</i> . |

1. BURSERA L.

Trees with balsamic resinous juices. Leaves compound or simple. Flowers small, polygamous, in lateral panicles or racemes, sometimes clustered. Calyx small, with 3-6 lobes. Petals 3-6, valvate. Stamens twice as many as the petals, inserted at the base of the annular disk. Ovary 3-celled; style very short; stigma obtusely 3-lobed. Drupe indistinctly 3-angled; epicarp leathery-fleshy, resinous, separating into three valves; stone usually solitary, bony, triangular, united to a persistent fleshy axis, 1-celled, 1-seeded.

Species 100, natives of the tropics, chiefly America.

Leaves compound.

- | | |
|---|------------------------------|
| Leaflets papery. Bark flaking off..... | 1. <i>B. Simaruba</i> . |
| Leaflets leathery. Bark persistent..... | 2. <i>B. Hollickii</i> . |
| Leaves simple | 3. <i>B. simplicifolia</i> . |

1. ***B. Simaruba*** Sarg. *Gard. & For.* iii. 260 (1890); leaves compound; leaflets papery; bark flaking off.—*Sarg. Silv.* i. 97, t. 41, 42; *Engl. in Engl.-Prantl Pflzfam.* iii. pt. 4, 249, f. 145; *Urb. Symb. Ant.* iv. 324. *Bursera gummosa* L. *Sp. Pl. ed.* 2, 471 (1762); *Jacq. Sel. Stirp. Amer.* 94, t. 65 (*Burseria*) & *Ed. piet.* t. 96; *Sw. Obs. Bot.* 131; *Wright Mem.* 193; *Macf. Jam.* i. 229; *Griseb. Fl. Br. W. Ind.* 173; *Baill. Hist.* v. 261, f. 269-274; *Engl. in DC. Mon.* iv. 39, t. 1, f. 33-39; *Cook & Coll. in Contrib. U.S. Nat. Herb.* viii. 97, t. 21. *Betula arbor Americana* &c. *Pluk. Phyt.* t. 151, f. 1. *Terebinthus major betulae* &c. *Sloane Cat.* 167 & *Hist.* ii. 89, t. 199. *T. foliis cordato-ovatis* &c. *Browne Hist. Jam.* 345. *T. Brownei* *Jacq. Enum. Pl. Carib.* 18 (1760). *T. simaruba* *W. F. Wight, ex Rose in Contrib. U.S. Nat. Herb.* x.

122 (1906–1908). *Pistacia Simaruba L.* Sp. Pl. 1026 (1753); *Descourt. Fl. Ant. ii. t. 97.* *Elaphrium Simaruba Rose in N. Amer. Fl. xxv. 246 (1911).* (Fig. 68.) Type in Herb. Sloane in Herb. Mus. Brit.; Plukenet's specimen is also in Herb. Mus. Brit.

Red Birch, West Indian Birch, Turpentine Tree, Incense Tree, Mastic Tree.

Sloane Herb. vi. 104, 105! *Broughton!* *Shakspear!* *Swartz!* *Macfadyen!* St. Andrew, *McNab!* King's House, J.P. 1153, *Hart!* near Hope, *Moore!* Spanish Town road, *Campbell!* Hope; Westphalia road, Great Goat Is.; Port Henderson; *Harris!* Fl. Jam. 6299, 6768, 7357, 8236, 8517, 9315, 10,151.—Florida and Keys, Bahamas, West Indies, Central America, Tres Marias Is., Colombia, Venezuela.

Tree 20–30(–60) ft. high; trunk thick to 3 ft. in diam.: larger branches stout, spreading nearly at right angles; bark an inch thick,

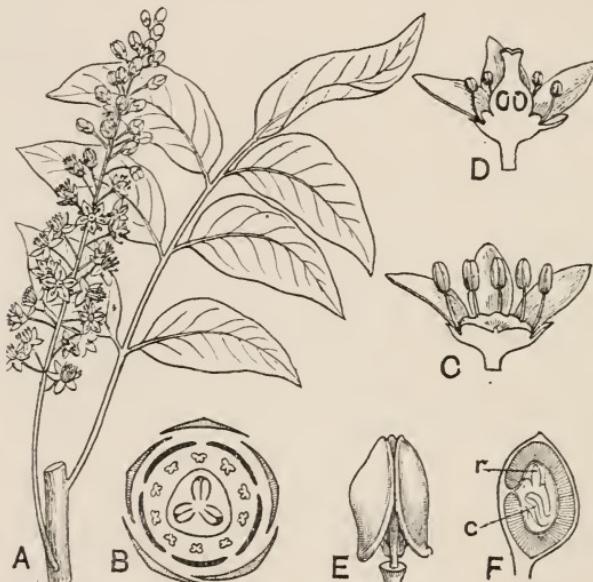


Fig. 68.—*Bursera Simaruba* Sarg.

A, Small leaf and inflorescence $\times \frac{1}{2}$.
B, Diagram of hermaphrodite flower.
C, Male flower $\times 4$.
D, Fertile flower $\times 4$.

E, Drupe, nat. size.
F, Stone cut lengthwise $\times 1\frac{1}{2}$; c, cotyledons; r, radicle.

(After Sargent.)

with glandular dots, scaling off in thin papery red-brown pieces. Leaflets 9–3 (13–1), oblong-ovate, acuminate, somewhat unequal-sided, oblique at the base, entire, glabrous on both sides except at base of midrib beneath, veins reticulate and prominent beneath, 6–8 (3–11) cm. l. Flowers appearing before the leaves or while they are still young, white; panicles many-flowered, of male flowers to 17 cm. l., of fertile flowers about half as long. Male flowers: Calyx 5-lobed, 1–1.5 mm. l. Petals 5, 2·5–3 mm. l., spreading, ovate-elliptical. Stamens 10, about as long as the petals. Hermaphrodite flowers: Sepals and petals 3. Stamens 6, about half as long as petals, with smaller anthers. Disk shallowly-lobed.

Drupe 1-1·5 cm. l.; epicarp dark red; nutlet covered with a light pink skin.

This tree sheds its leaves during March and April, and, after remaining bare for a few weeks, produces its flowers and young leaves. All parts abound with a glutinous balsamic juice of a turpentine odour. The juice forms, on inspissating, a clear transparent gum-resin, "budge gum," of a dark green colour, resembling gum mastic, and capable of being used instead of it as a transparent varnish (Macfadyen). The wood is very light, spongy, soft, and weak. Branches planted in the ground quickly and readily grow into trees, so that they may be used as "grow-posts" to form a fence. The wood, both of this species and of *B. simplicifolia*, is used for match-sticks in the local match factory.

2. *B. Hollickii* comb. nov.; leaves compound; leaflets leathery; bark persistent.—*Terebinthus Hollickii* Britton in Bull. Torr. Bot. Cl. xxv. 341 (1908). *Elaphrium Hollickii* J. N. Rose in N. Amer. Fl. xxv. 246 (1911).

Dry rocky hillside, Port Henderson, Britton & Hollick, 1816!

Tree to 18 ft. high; trunk 2·5 dm. in diam.; bark reddish-grey outside, red inside, close, not peeling off in papery layers. Leaflets 3-7, elliptical or ovate-elliptical, 3-6 cm. l., entire, shortly acuminate, glabrous, veins inconspicuous on the upper surface, prominent beneath. Common petiole and rhachis pubescent. Flowers not known. Inflorescence a raceme, simple or slightly compound, few-fruited, 4-7 cm. l., rhachis pubescent. Fruit 8-10 mm. l., about 7 mm. thick; pedicels 4-5 mm. l.

3. *B. simplicifolia* DC. Prodr. ii. 78 (1825); leaves simple.—*Macf. Jam. i.* 230; *Engl. tom. cit.* 38; *Urb. Symb. Ant. vi.* 102. *Amyris Lunani* Spreng. Syst. ii. 217 (1825) (according to Urban loc. cit.). *Terebinthus simplicifolia* Britton in Bull. Torr. Bot. Cl. xxv. 342 (1908). *Elaphrium jamaicense* Rose in N. Amer. Fl. xxv. 244 (1911).

Black Birch.

Coastal limestone hills, but somewhat rare; Macfadyen! Great Goat Is.; Long Mountain, south side, 900 ft.; road to Wareka, 100 ft.; Harris! Fl. Jam. 9326, 9591, 10,166, 11,946.

Tree with spreading head, 15-40 ft. high; bark of trunk rough and scaly. Leaves elliptical, sometimes obovate, somewhat leathery, entire, glabrous on both sides, nerves slightly prominent on both sides, veins obscure, 7-3 cm. l. Flowers greenish-yellow or white, fragrant; panicles with few flowers, 4-6 cm. l. Male flower: Calyx about 1·3 mm. l. with 4 segments. Petals 4, about 2·3 mm. l., valvate, spreading, ovate-elliptical. Stamens 8, shorter than the petals. Hermaphrodite flower: Calyx about 1 mm. l., with 3 segments. Petals 3, about 2 mm. l., oblong-elliptical. Stamens 6, much shorter than the petals. Style wanting; stigma indistinctly 3-lobed. Fruit 8-9 mm. l.

2. PROTIIUM Burm.

Trees. Leaves imparipinnate with entire leaflets in 1-5 pairs. Flowers hermaphrodite or polygamous, subsessile or sessile, crowded on short branches of a panicle. Calyx small, 4-5-lobed; lobes imbricate at base in bud. Petals 4-5, valvate.

Stamens 8–10, inserted at base of disk. Disk 8–10 crenate, annular or cup-shaped in hermaphrodite flowers, flat-convex in male flowers. Ovary 4–5-celled; style varying in length; stigma 4–5-lobed. Drupe globular or ovoid, often apiculate with the persistent style, composed of 1–5 cocci, each 1-celled, 1-seeded.

Species about 50, natives of the tropics, chiefly American.

P. attenuatum Urb. *Symb. Ant.* vii. 240 (1912).—*Icica heptaphylla* Griseb. *Fl. Br. W. Ind.* 173 (1859) (in part) (non Aubl.). *Protium guianense* Engl. in *Fl. Bras.* xii. pt. 2, 271 (1874) & in *DC. Mon.* iv. 72 (in part) (non March.). *P. guianense* March. var. *Oliver* in *Hook. Ic. Pl.* t. 1571 (1887). *Icica attenuata* Rose in *N. Amer. Fl.* xxv. 261 (1911). (Fig. 69.)



Fig. 69.—*Protium attenuatum* Urb.

A, Leaf with portion of panicle in fruit

$\times \frac{1}{3}$.

B, Flower $\times 4$.

C, Ditto with calyx and petals removed

D, Pistil and disk $\times 4$.

E, Ovary cut across $\times 4$.

(After Oliver in *Hook. Ic. Pl.*)

Wright! in *Herb. Kew.*—Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent.

Leaves, common petiole, 2–8 cm. l., flattened above, petiolules more or less thickened at the apex, lateral 6–1·2 cm. l., terminal 1·5–3 cm. l.; leaflets 5–7 (3) ovate, ovate-elliptical, or elliptical-oblong, acuminate, base more or less oblique in lateral leaflets, 7–13 cm. l., 3–5·5 cm. br.; nerves and densely reticulated veins prominent on both sides, leathery, glabrous. Panicle 3–5 cm. l., glabrous, branching from the base; pedicels 2–3 mm. l. Calyx: lobes 5, shortly triangular. Petals 5, 2·8–3 mm. l., green, ovate-lanceolate, margin densely and minutely tomentose. Stamens 10, filaments 1·2–1·5 mm. l. Disk fleshy. Ovary glabrous; style very short;

stigma 5-lobed. Fruit of 2 carpels broadly ovate, 2·2-2·7 cm. l., 1·5-2 cm. br.; of 1 carpel ovate-elliptical, 3-cornered 1-1·5 cm. br.

P. Copal Engl. is a native of Mexico. There is a specimen in Herb. Miller in Herb. Mus. Brit. marked "Jamaica?" It differs from the above species in the parts of the flowers being in 4's, in the oblong apiculate leadlets, and in the longer panicle to 12 cm. l. with puberulous rhachis.

FAMILY XLVIII. MELIACEÆ.

Trees or shrubs, the wood of which is often hard, coloured, and sometimes sweet-scented. Leaves alternate, without stipules, generally pinnate, 3-foliolate in *Trichilia polyneura*, 2-pinnate in *Melia Azederach*; leaflets entire. Flowers rather small, paniculate. Calyx 4-5-lobed, imbricate. Petals 4-5, imbricate, convolute or valvate in bud. Disk various, sometimes inconspicuous, sometimes ring-like, or more or less enclosing the ovary; in *Cedrela* the disk forms a column to which both the petals and the filaments are attached half-way from the base. Stamens 8-10 (in *Cedrela* 5), filaments attached outside the base of the disk, united more or less into a tube; anthers sessile or shortly stalked, attached on the inside of the tube, in *Cedrela* the filaments are distinct above the attachment to the column. Ovary 2-5-celled. Ovules in each cell usually 2, collateral or superposed, in *Cedrela* and *Swietenia* 8-12; raphe ventral; micropyle superior. Fruit a capsule or drupe. Seeds with or without endosperm.

Species nearly 600, natives of warm regions of America and Asia, rarer in Africa.

Stamens more or less cohering to form a tube.

Leaves pinnate. Fruit a capsule.

Seeds winged..... 3. *Swietenia*.

Seeds not winged.

Capsule 3-2-valved or not opening. Leaves
imparipinnate 1. *Trichilia*.

Capsule 4-valved. Leaves pinnate 2. *Guarea*.

[Leaves 2-pinnate. Fruit a drupe *Melia*.]

Stamens and petals attached below to the column, free above 4. *Cedrela*.

1. TRICHILIA L.

Trees or shrubs. Leaves imparipinnate or (in *T. polyneura*) 3-foliolate. Panicles axillary, or terminal and axillary, many-flowered. Calyx small with 5 or 4 teeth or segments. Petals 5 or 4, imbricate or valvate. Stamens 10 or 8; filaments united at the base and more or less adhering above, united to the apex in *T. moschata*; anthers terminal. Ovary on a disk, 3-2-celled; ovules 2 or 1, at the central angle of each cell; stigma usually

3-2-lobed, capitate. Fruit a subglobose leathery capsule, 3-2-celled, loculicidally 3-2-valved, generally with 1 or 2 seeds in each cell. Seeds without endosperm, enclosed in a fleshy, usually scarlet, aril; radicle superior.

Species about 130, natives of tropical America (including West Indies), and a few in tropical Africa.

Leaves with more than 1 pair of leaflets.

Leaflets in 7-11 pairs, opposite or alternate..... 1. *T. hirta*.

Leaflets in 3-4 pairs.

Leaflets alternate.

Capsule 2-4 valved, 1·5 cm. l. 2. *T. moschata*.

Capsule not opening, to 2·5 cm. l. 3. *T. Harrisii*.

Leaflets opposite.

Panicles corymbose, at ends of branches 4. *T. glabra*.

Panicles umbel-like, crowded, axillary 5. *T. havanensis*.

Leaves 3-foliolate 6. *T. polyneura*.

1. ***T. hirta*** L. *Syst. ed.* 10, 1020 (1759) & *Amoen. v.* 378; leaflets opposite or alternate, in 7-11 pairs, glabrous on upper surface, subhirsute beneath on midrib and nerves; panicles axillary, long-peduncled, branches short, subequal, mostly in clusters of 2 or 3; petals glabrous; filaments emarginate at apex, glabrous outside, hirtellous inside and on the margin; anthers hirtellous.—*Griseb. Fl. Br. W. Ind.* 129; *Urb. Symb. Ant. iv.* 327. *T. subhirsuta*, foliis pinnatis ovatis, racemis alaribus *Browne Hist. Jam.* 278. *T. spondioides* *Jacq. Enum. Pl. Carib.* 20 (1760) & *Sel. Stirp. Amer.* 128; *Sw. Prodr.* 67 & *Fl. Ind. Occ.* 730; *A. Juss. in Mém. Mus. Par. xix.* 236, t. 18, f. 18a (anthers should have been represented hirtellous); *Macf. Jam. i.* 169; *Griseb. loc. cit.*; *Wils. in Reports Geolog. Jam.* 275; *C. DC. in DC. Monog. Phan.* i. 665. *Fraxinus americana* racemosa tricoccos *Plum. Ic. ined. ii.* 82. *Euonymus caudice &c. Sloane Cat.* 171 & *Hist. ii.* 103, t. 210, f. 2, 3.

Sloane Herb. vii. 30! Browne; Wright! Macfadyen; Prior; March! Wilson! J.P. 1303, Morris! Constant Spring; Port Morant; Hitchcock; Green Valley, Blue Mts.; Mona, Liguanea plain; Harris! Fl. Jam. 5212, 7693.—Cuba, Is. of Pines, Hispaniola, Porto Rico, St. Thomas, St. Cruz, St. John, Mexico, Tres Marias Is., Colombia, Venezuela.

An authentic specimen collected by Swartz in Hispaniola is in Herb. Mus. Brit.

A shrub or tree, 10-20 ft. high. Leaves 4·5(-2) dm. l.; petiole 5-13 cm. l.; leaflets elliptical to oblong-elliptical, acuminate, base very unequal, 5-10 cm. l., those in the middle largest. Inflorescence 5-20 cm. l.; peduncle to 11 cm. l. Flowers greenish-white or -yellow. Calyx 7 mm. l., 5-cleft, glabrous, but sometimes subciliate at the apex of the deltoid segments. Petals 2·5-4 mm. l., 5, elliptical to oblong, valvate. Filaments 2 mm. l., 10; anthers 1 mm. l. Ovary hirtellous on a glabrous shallow disk. Style about as long as the ovary, hairy. Stigma globular, depressed above. Capsule globular, about 1 cm. in diam., pubescent-tomentose or glabrescent, 3-(2)-valved. Seeds oblong-ovoid, covered with a red aril.

2. *T. moschata* Sw. *Prod. 67* (1788); leaflets alternate, 7–9, glabrous, or sometimes minutely tomentose beneath and hirsute along the midrib; panicles axillary; petals puberulous; staminal tube glabrous, a pair of awl-shaped teeth alternating with the anthers; capsule 1·5 cm. l., 2–4-valved.—*Sw. Fl. Ind. Occ. 735*; *Macf. Jam. i. 170*; *C. DC. tom. cit. 686*. *T. membranacea* *Macf. Jam. i. 171* (1837). *T. Distini C. DC. tom. cit. 698* (1878). *Laurus folio breviore &c.* *Sloane Cat. 136* & *Hist. ii. 21, t. 166*, f. 1. *Moschoxylum Swartzii A. Juss. tom. cit. 239* (1830); *Wils. loc. cit.*; *Griseb. op. cit. 130*.

Muskwood.

Northern parts of the Island, *Sloane Herb. v. 74!* *Wright!* *Robins!* *Macfadyen!* *Distin!* *Prior!* Green Valley, Blue Mts.; banks of Black River; near Beaufort, Westmoreland, 1400 ft.; Negril; near Montego Bay; Toms Cave Wood, Upper Clarendon, 2500 ft.; Peckham, Clarendon, 2300 ft.; Soho, St. Ann, 1400 ft.; *Harris!* *Fl. Jam. 5637*, 9852, 9908, 10,230, 10,239, 10,319, 10,855, 11,081, 12,027.

Tree 15–40 ft. high. Leaves 1–3 dm. l.; petiole 1·5–2·5 cm. l.; leaflets elliptical or oblong-elliptical, apex abruptly acuminate, glabrous, 6–16 cm. l. Inflorescence to 10 cm. l.; rhachis puberulous or glabrate. Calyx about 1·5 mm. l., puberulous; lobes 5 (or 4), broadly deltoid. Petals 5 (or 4), adherent below, greenish-yellow or pale yellow, ovate-oblong, nearly 3 mm. l., valvate, apex hooded. Staminal-tube about 1·5 mm. l., with 8 or 10 sessile anthers; anthers about half as long as the tube. Pistil about as long as the staminal-tube; style shorter than the ovary; stigma globular; ovary tomentose. Capsule tomentose, ellipsoidal, 1-seeded. Seed, when ripe, as long as the capsule; aril scarlet.

The figure in Sloane is drawn from a specimen in which the leaflets and panicles have been placed haphazard on the twigs, and is therefore not a true representation of this species.

3. *T. Harrisii* Britton in *Bull. Torr. Bot. Club xxxv. 568* (1908); leaflets alternate, 5–9, glabrous; panicles axillary; capsule to 2·5 cm. l., surface more or less wrinkled, not opening or only after some time.

In woods, Dolphin Head; *Harris!* also *Britton 2269! Fl. Jam. 10,282, 10,286.*

Tree 20–30 ft. high; twigs glabrous. Leaves 2–3 dm. l.; petiole 1·5–2·5 cm. l.; leaflets elliptical or oblong-elliptical, abruptly acuminate, 7–17 cm. l. Fruiting panicles 4–15 cm. l.; rhachis puberulous or glabrate. Flowers not known. Capsule ellipsoidal to globular, densely tomentose, 1-seeded.

Urban (*Symb. Ant. vi. 96*) suggests that *T. Harrisii* Britton is only a form of *T. moschata* Sw., but this can only be decided by the examination of further material.

4. *T. glabra* L. *Syst. ed. 10, 1020* (1759) & *Amœn. v. 378*; leaflets opposite, in 3–4 pairs, glabrous except for a hairy membranous expansion usually occurring in the axils of the nerves beneath; panicles somewhat corymbose, terminal and crowded in the upper axils; petals minutely tomentose; filaments puberulous-tomentose on both sides; anthers glabrous.—*A. Juss. tom.*

cit. 236 (1830); *Macf. Jam.* i. 172. *T. foliis oblongo-ovatis, pinnatis, nitidis; racemis laxis rarioribus &c.* *Browne Hist. Jam.* 279. *T. terminalis* *Jacq. Enum. Pl. Carib.* 20 (1760) & *Sel. Stirp. Amer.* 130; *C. DC. tom. cit.* 662. *T. hirta Sw. Obs. Bot.* 171 (1791) & *Fl. Ind. Occ.* 732 (non *L.*); *Wils. loc. cit.* *T. Sloanei Macf. Jam.* i. 168 (1837). *Pruno fortis affinis arbor folio alato &c.* *Sloane Cat.* 182 & *Hist. ii.* 128, *t.* 220, *f.* 1. *Acerilia Sloanei Griseb. op. cit.* 129 (1859).

Browne's specimen, the type, is in Herb. Linn., named in Solander's hand.

Between Passage Fort and St. Jago de la Vega, *Sloane Herb.* vii. 66* and 67! *Houston!* *Browne!* *Wright!* *Broughton!* *Dancer!* *Shakspear!* *Macfadyen!* St. Andrew, *McNab!* Lime Savanna, Clarendon, *Purdie!* *Prior!* *March!* Cinchona, J.P. 1000, *Hart!* Grant's Pen, St. Andrew, *Campbell!* Halls Delight; Sheldon road, 2500 ft.; Berwick Hill, 2500 ft.; Lapland, 1500 ft.; Long Mountain, 800 ft.; Great Goat Is.; Kempshot, 1100–1600 ft.; Oxford, near Balaclava, 2000 ft.; *Harris!* *Fl. Jam.* 5479, 5615, 5846, 5874, 9168, 9592, 10,173, 10,332, 10,674.—Cayman Is., Cozumel Is.

Shrub or tree 8–40 ft. high; sometimes with several trunks; branches few, mostly at the top of the trunks. Leaves 1–2·5 dm. l., chiefly at the ends of branches; petiole 4–5 cm. l.; leaflets elliptical, oblong-elliptical, or ovate, apex usually acuminate, base somewhat unequal, 4–7(–10) cm. l. Inflorescence 5–10 cm. l.; panicles long-stalked. Flowers fragrant. Calyx puberulous, about 2 mm. l., 4–5-cleft; segments ovate-triangular, acute or apiculate. Petals 5–8 mm. l., greenish- or yellowish-white, oblong, valvate, spreading. Stamens 8 or 10; filaments united to form a tube, but easily separable, 2·5–4·5 mm. l., anthers about 1 mm. l. Disk yellowish, puberulous above, lobed. Pistil about as long as the filaments; ovary partially immersed in the disk, hairy; style puberulous, expanded at the apex into a broad conical stigma. Capsule globular, greenish, tomentose, 3–(2)-valved, 2–4-seeded; valve 1–1·8 cm. br. Seeds nearly as long as the capsule, black, partially covered with a red aril.

Barbillus foliis &c. Browne *Hist. Jam.* 216 is possibly this species.

5. *T. havanensis* *Jacq. Enum. Pl. Carib.* 20 (1760) & *Sel. Stirp. Amer.* 129, *t.* 175, *f.* 38; leaflets opposite, in 3 (2–4) pairs, glabrous; panicles umbel-like, densely crowded; petals glabrous; filaments with 2 lanceolate teeth at the apex of each, glabrous or more or less hairy; anthers very shortly stalked, between the teeth of the filaments, glabrous.—*C. DC. tom. cit.* 676. *T. glabra Jacq. Sel. Stirp. Amer. Ed. pict. t.* 260, *f.* 35 (1780?). *T. odorata Andr. Bot. Rep.* *t.* 637; *Hook. Exot. Fl.* *t.* 128; *C. DC. tom. cit.* 675. *T. moschata Sw. var. odorata DC. Prodr.* i. 623 (1824). *T. moschata Sw. var. octandra Macf. Jam.* i. 171 (1837). *T. jamaicensis C. DC. tom. cit.* 678 (1878). *Portesia ovata Cav. Diss. vii.* 369, *t.* 215 (1789); *Griseb. op cit.* 130; *Wils. loc. cit.* (Fig. 70.)

Broughton! “common in the mountains,” *Macfadyen!* Manchester, *Purdie!* *Wilson!* *Moneague, Prior!* Mavis Bank, J.P. 1134; Westphalia road, J.P. 1427; *Hart!* Mandeville, *Scharschmidt!* Pleasant Hill, 2500 ft.;

near Brown's Town, 1000 ft.; near Kendal, 1500 ft.; Harris! Fl. Jam. 6145, 7051, 8207.—Cuba, Hispaniola, Central America.

Tree or shrub 12–25 ft. high. *Leaflets* elliptical to narrowly elliptical or oblong-elliptical, sometimes obovate, apex variable, rounded to shortly acuminate, base wedge-shaped or obtuse, generally unequal, 5–14 cm. l., 3 terminal leaflets approximate; petiole 6–3 cm. l. *Panicles* 1–2 cm. l. *Flowers* sweet-scented; pedicels 3–4 mm. l. *Calyx* divided nearly to the base; segments 4(–5), ovate, minutely puberulous, 1·3–1·5 mm. l. *Petals* 4(–5), yellowish, 3·3–3·5 mm. l., elliptical, obtuse. *Stamens* 8(–10); filaments

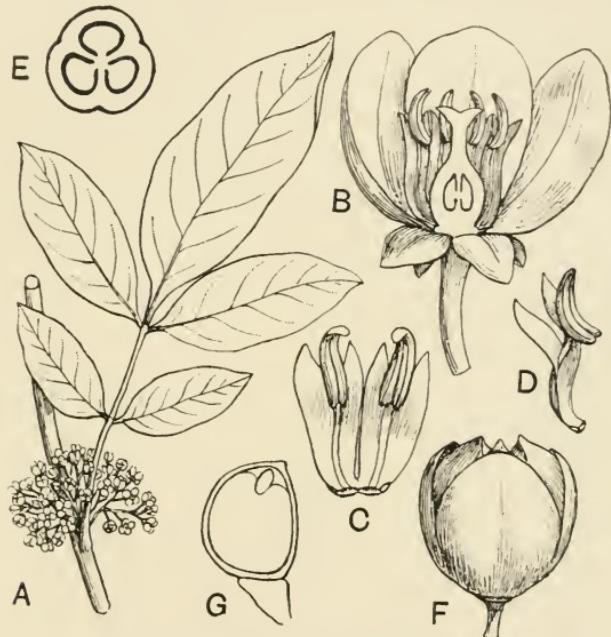


Fig. 70.—*Trichilia havanensis* Jacq.

A, Leaf and inflorescence $\times \frac{1}{2}$.

E, Ovary cut across, greatly enlarged.

B, Flower cut lengthwise $\times 7$.

F, Capsule $\times 2$.

C, Two stamens, front view $\times 10$.

G, Seed cut lengthwise $\times 2$.

D, Stamen, side view $\times 10$.

united at the base, more or less adhering above, about 1·5 mm. l.; anthers linear-lanceolate, nearly 1 mm. l. *Pistil* as long as the stamens, glabrous, on a shallow disk; style much shorter than the ovary; stigma indistinctly 3-lobed; ovary 3-celled. *Capsule* 3(–2)-valved, about 1 cm. l.; aril red.

6. *T. polyneura* Urb. *Symb. Ant.* v. 380 (1908); leaflets 3.

Papine estate, St. Andrew, 900 ft.; Long Mountain, west, near Kingston, 700 ft.; Harris! Fl. Jam. 8380, 8860.

Shrub or slender *tree*, sometimes with several stems, 15–20 ft. high. *Leaflets* narrowly elliptical or obovate-oblong, apex generally rounded, base acute, glabrous, leathery, nerves on both sides densely net-veined, prominulous, 3·5–7 cm. l.; petiole 2–1 cm. l. *Panicles* raceme-like, with very short branches. *Peduncle* 5–2·5 cm. l.; branches 1–3 mm. l., 3–1-flowered. *Calyx* about 1·5 mm. l., puberulous, with 4 or 5 short lobes. *Petals* 4 or 5, white, lanceolate- or oblong-elliptical, 3·3 mm. l., tomentose

outside. Stamens alternately longer and shorter; filaments glabrous, united in a tube for about three-quarters of their length, the longer filaments 2 mm. l., free above the tube, 2-toothed, one or more of shorter stamens sometimes abortive. Ovary very hairy, with erect hairs; style very short; stigma capitate. Capsule 13-18 mm. l., covered with brownish tomentum, 3-valved, valves keeled along a median line inside, leathery. Seed solitary, about 14 mm. l.

2. GUAREA L.

Trees or shrubs. Leaves pinnate, continuing for some time to produce new leaflets at the apex. Panicles axillary. Flowers rather small. Calyx short, cup-like, with 4 teeth. Petals 4(-5). Stamens 8; mouth of staminal-tube entire or slightly crenate; anthers sessile. Ovary 4-celled. Ovules in each cell, 1 or 2 superposed. Fruit a leathery or woody capsule, 4-celled, opening at length loculicidally with 4 valves. Seeds 1 or 2 in each cell, enclosed in an aril; cotyledons superposed; radicle dorsal.

Species about 90, mostly natives of tropical America, including the West Indies, a few in tropical Africa.

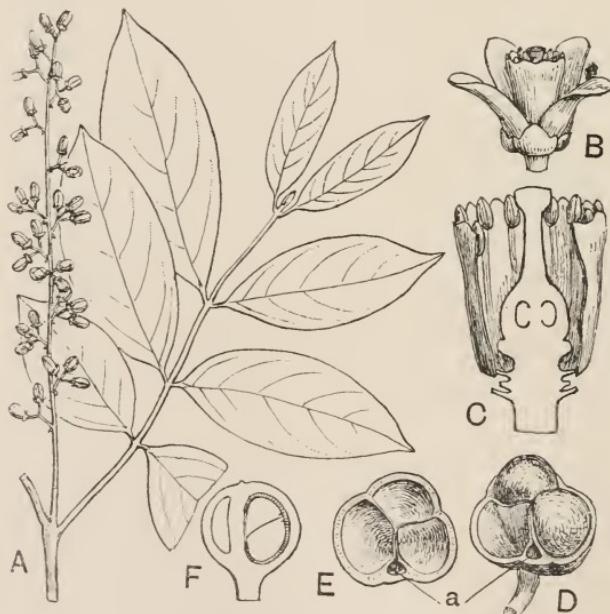


Fig. 71.—*Guarea glabra* Vahl.

- A, Leaf and inflorescence $\times \frac{1}{3}$.
 B, Flower $\times 2$.
 C, Staminal-tube cut open, pistil cut lengthwise $\times 3$.
 D, E, Capsule cut across, one seed removed; a, abortive cell $\times 3$.
 F, Capsule cut lengthwise through a seed and an abortive cell $\times 3$.

G. glabra Vahl *Ecolg. Am. iii. 8 (1807)*. *G. trichilioides* Sw. *Obs. Bot. 146 (1791)* (non *L.*); *Wright Mem. 264*. *G. Swartzii*

DC. *Prodri.* i. 624 (1824); *Macf. Jam.* i. 172; *Griseb. Fl. Br. W. Ind.* 131. *G. Vahliana A. Juss. in Mém. Mus. Hist. Nat.* 282 (1830–1). *Lauro affinis arbor foliis latioribus &c. Sloane Cat.* 137, & *Hist. ii.* 24, t. 170, f. 1. *Eleutheria arborea &c. Browne Hist. Jam.* 369. (Fig. 71.)

Musk Wood, Alligator Wood, Wild Akee.

Fls. Aug.–Nov.; *Wright!* “Common in Port Royal Mts.; near Catherine’s Peak; St. Thomas in the East”; *Macfadyen!* *Prior!* Latimer, near Cinchona, J.P. 1216, *Hart!* Chester Vale Road; near Woodcutter’s Gap, 3800 ft.; Schwallenburg, 2000 ft.; Grandvale, Westmoreland, 500 ft.; Mabess River; Tyre, near Troy, 2000 ft.; Dolphin Head; Tom’s Cave Wood, Clarendon, 2500 ft.; Peckham Woods, Clarendon, 2500 ft.; *Harris!* south end, John Crow (Blake) Mts. *Harris & Britton!* Fl. Jam. 5384, 6071, 6288, 7039, 7040, 7065, 7700, 9484, 10,284, 10,754, 10,853, 10,960, 11,025.—St. Cruz, Montserrat, Guadeloupe.

Tree 15–40 ft. high. Leaves, petiole and rachis 3–22 cm. l. Leaflets in 2–5 pairs, opposite (sometimes alternate), elliptical or lanceolate-elliptical, apex often shortly acuminate, glabrous but more or less puberulous on nerves beneath, bearded in axils of nerves beneath, 4–20 cm. l. Inflorescence racemose, lax-flowered, with occasional very short 2–5-flowered branches, 2–25 cm. l.; pedicels 2–4 mm. l. Flowers white, fragrant. Calyx minutely and sparsely puberulous or glabrescent, 1–3 mm. l., subentire or 4-lobed, teeth 4, minute, distant. Petals 4 or 5, more or less minutely puberulous, especially towards the apex, valvate, free or adhering near base, 6–7 mm. l., oblong, apex subobtuse. Staminal tube glabrous. Ovary glabrous, sessile on the short disk. Style glabrous, about as long as the ovary. Capsule globular, about 2 cm. in diam., 2–4-celled with 1 seed in each cell. Seed 1·5 cm. l.; aril scarlet.

All parts of this tree, especially the bark, have a strong smell of musk. The powdered bark is said to be a good emetic. The wood is red, soft, and splits easily.

[MELIA L.]

Trees or shrubs. Leaves simply pinnate or 2–3-pinnate, with an odd leaflet, 2-pinnate in *M. Azederach*. Panicles axillary, with numerous flowers. Calyx 5–6-cleft, imbricate in bud. Petals 5–6, linear-spathulate, convolute, spreading. Staminal tube long, slender, cut at the apex into numerous linear strips. Anthers 10, sessile within the tube at apex. Disk ring-like. Ovary 5–6-celled; ovules 2, superposed, in each cell; style long, slender; stigma capitate, 5–6-lobed. Fruit a somewhat fleshy drupe; stone 1–5-celled, with 1 seed in each cell. Seeds pendulous, with foliaceous cotyledons; endosperm scanty or wanting.

Species about 12, natives of tropical Asia and Australia, one species (*M. Azederach*) widely subs spontaneous or cultivated throughout the tropics.

M. Azederach L. Sp. Pl. 384 (1753); *C. DC.* in *Fl. Bras.* xi pt. 1, 167, t. 50 & *DC. Monog. Phan.* i. 451; *Descourt. Fl. Ant.* i 210, t. 26; *Bot. Mag.* t. 1066; *Cook & Coll. in Coatrib. U.S. Nat.*

Herb. viii. 190, t. 45; *Watt Econ. Prod.*; M. Azederach var. *semperfiriens* *Sw. Obs. Bot.* 171 (1791). *Urb. Symb. Ant.* iv. 325. M. *semperfiriens* *Sw. Prodr.* 67 (1788) & *Fl. Ind. Occ.* 737; *Bot. Reg.* t. 643; *Wright Mem.* 269; *Macf. Jam. i.* 167; *Griseb. Fl. Br. W. Ind.* 128. Specimen in *Herb. Hermann* in *Herb. Mus. Brit.* and one in *Herb. Linn.* named by *Linnæus*.

Hoop Tree, West Indian Lilac, Bead Tree.

Common; *Macfadyen! March!* *Liguania* plain, *Campbell!* also *Harris!* *Fl. Jam.* 6232, 7359, 7715, 8372; not mentioned by Sloane or Browne, and therefore probably of late introduction, now subs spontaneous and cultivated.—Found now throughout the tropics, a native of northern India, and of Persia and China.

Shrub or tree (to 40 ft. high in India). Leaves 2-pinnate, 2-4 dm. l.; pinnae in 2-5 pairs, with an odd pinna, opposite; leaflets subovate-lanceolate, acuminate, base somewhat unequal, margin serrate, glabrous, 2-7 cm. l. Flowers showy, lilac or blue mixed with purple and white, honey-scented. Sepals 1·5-2 mm. l., puberulous. Petals 7-9 mm. l. Staminal-tube cylindrical, 10-ribbed outside, hairy within; anthers oblong, yellow. Ovary glabrous, 5-celled; stigma 5-lobed. Drupe ellipsoidal, yellow, about 1·5 cm. l., 4-5-celled.

The leaves and dried fruit are used in India to protect clothes, books, papers, &c., from the ravages of insects. The stone from the fruit is used all over India as a bead, being perforated and strung into necklaces and rosaries. (Watt.)]

3. SWIETENIA L.

Tree with dark red wood. Leaves abruptly pinnate, alternate, glabrous; leaflets opposite, stalked. Flowers small, on corymb-like branches of axillary and subterminal panicles. Calyx 5-lobed. Petals 5, convolute in bud. Stamens united into an urn-shaped tube with 10 teeth; anthers attached internally between the teeth. Ovary 5-celled. Ovules about 12 in each cell, horizontal on the central axis. Fruit a woody capsule, septicidally 5-valved from the base; valves 2-lamellate; axis 5-angled, 5-winged at base. Seeds numerous, pendulous, with a terminal oblong wing. Cotyledons closely attached together and to the fleshy endosperm; radicle papillæform, opposite the chalaza.

Species 2, one a native of the West Indies, Central America and Peru, the other of the Pacific coast of Mexico.

S. *mahagoni* *Jacq. Enum. Pl. Carib.* 20 (1760) & *Sel. Stirp. Amer.* 127; *L. Sp. Pl. ed. 2*, 548; *Descourt. Fl. Ant.* ii. t. 99; *Tussac Fl. Ant.* iv. 65, t. 23; *Hook. Bot. Misc. i.* 21, t. 16, 17; *Macf. Jam. i.* 175; *Griseb. Fl. Br. W. Ind.* 131; *Wright Mem.* 237; *Baill. Hist. v.* 478, f. 471-476; C. DC. in *DC. Monog. Phan.* i. 723; *Sarg. Silv. i.* 100, t. 43, 44. Guppy Plants &c. W. Indies, 242. Arbor foliis pinnatis &c. *Catesby Nat. Hist. Carol.* ii. t. 81. *Cedrus mahagoni* *Miller Gard. Dict. ed. 8* (1768). *Cedrela* foliis pinnatis &c. *Browne Hist. Jam.* 158. (Fig. 72.)

Mahogany.

From the sea-shore up to 3000 ft.; in fl. after May rains; Wright! Broughton! Macfadyen! Parnell! Prior! Ball! King's House grounds, Harris! Fl. Jam. 8636.—Florida Keys, Bahamas, Cayman, Cuba, Hispaniola, St. Thomas, St. Cruz, Martinique, St. Vincent, Trinidad, Mexico, Honduras, Nicaragua, Peru.

Tree commonly 30–50 ft. high. Leaves 8–11 cm. l.; leaflets, 4 pairs, very unequal-sided, the base on the broader side rounded, lanceolate,

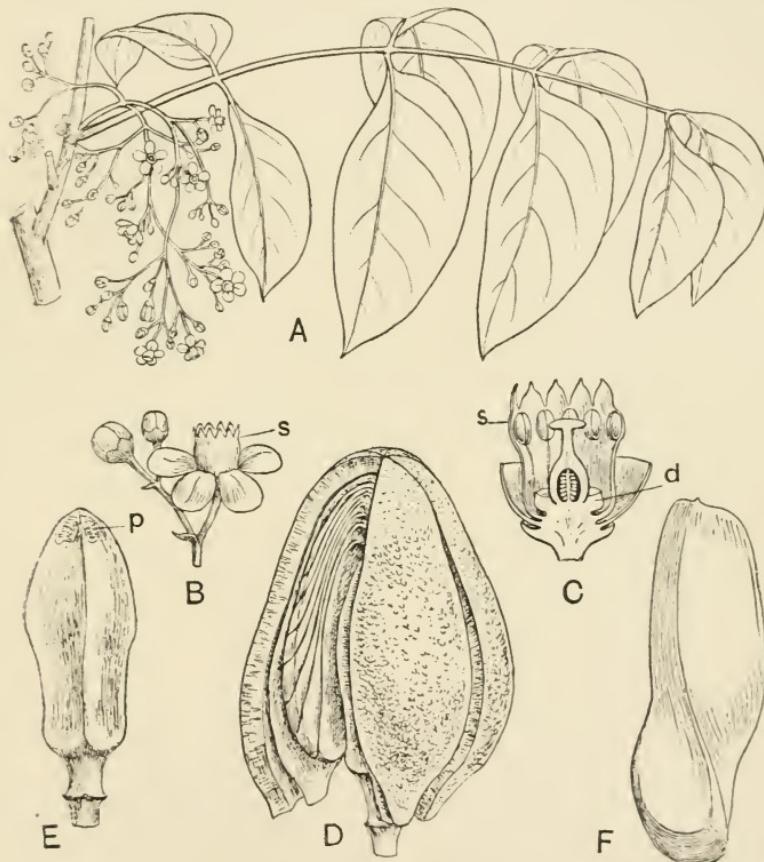


Fig. 72.—*Swietenia mahagoni* Jacq.

A, Leaf and inflorescence $\times \frac{1}{2}$.
 B, Buds and open flower; *s*, staminal tube $\times 1\frac{1}{2}$.
 C, Flower cut lengthwise; *s*, staminal tube; *d*, disk $\times 5$.

D, Fruit, ripe and splitting open (one valve removed), showing seeds $\times \frac{1}{2}$.
 E, Central axis of fruit; *p*, points of attachment of seeds $\times \frac{1}{2}$.
 F, Seed $\times \frac{2}{3}$.

(A after Hooker, Bot. Misc.)

apex acute, cuspidate, glabrous, 8–3 cm. l. Calyx about 1 mm. l., lobes rounded, glabrous. Petals white, elliptical, about 3·5 mm. l. Staminal tube about 3 mm. l. Capsule about 1 dm. l. Seeds about 6 cm. l.

Browne in 1756 wrote: "This tree grew formerly very common in Jamaica, and while it could be had in the low lands, and brought to market at an easy rate, furnished a very considerable branch of the exports.

It thrives in most soils, and varies both its grain and texture with each; that which grows among the rocks is smaller, but very hard and weighty, of a close grain, and beautifully shaded; while the produce of the low and richer lands is observed to be more light and porous, of a paler colour and open grain. . . . It is a pity that it is not cultivated in the more convenient waste lands. It is a very strong timber, and answers very well in beams, joists, planks, boards and shingles"; these may be seen in old houses. The most beautiful part of the wood is that obtained by sawing across the bottom of the stem and root. The bark is astringent, and has been recommended in decoction for diarrhoea. (Macfadyen.)

4. CEDRELA L.

High trees with coloured wood. Leaves abruptly pinnate, rarely imparipinnate; leaflets in many pairs. Panicle large, terminal. Calyx 5-lobed. Petals 5, imbricate, more or less keeled inside, and attached by the keel to the column. Disk forming a column. Stamens 5, adherent to the column, becoming free at its apex. Ovary sessile at the apex of the column, 5-celled. Ovules 8-12 in each cell, in two series, pendulous from the axis. Fruit a capsule, 5-celled, septifragally 5-valved from the apex, valves 2-lamellate becoming free from the septa-bearing axis. Seeds pendulous, winged below; endosperm scanty; cotyledons flat, subfoliaceous; radicle exserted, superior.

Species 8 or 9, natives of tropical America, including the West Indies.

C. odorata L. *Syst. ed.* 10, 940 (1759); *Macf. Jam. i.* 173; *Griseb. Fl. Br. W. Ind.* 131; *C. DC. in DC. Mon. i.* 737; *Cook & Collins in Contrib. U.S. Nat. Herb. viii.* 110; *Urb. Symb. Ant. iv.* 324. *Cedrus Barbadensium* &c. *Pluk. Phyt. t. 157, f. 1.* *Pruno forte affinis arbor maxima* &c. *Sloane Cat.* 182 & *Hist. ii.* 128, *t. 220, f. 2.* *C. foliis majoribus* &c. *Browne Hist. Jam.* 158, *t. 10, f. 1.* *Cedrus odorata* Mill. *Gard. Dict. ed.* 8 (1768). (Fig. 73.)

Jamaican, West Indian, Spanish, or Honduras Cedar.

Wright! *Cuming!* *Wilson!* *Prior!* *Hitchcock;* Port Royal Mts., *Bot. Dept.!* Hope grounds, *Harris!* *Fl. Jam.* 11,705.—Cuba, Is. of Pines, Cayman, Porto Rico, Antigua, Guadeloupe, Martinique, St. Lucia, Grenada, Trinidad, tropical continental America.

A timber tree, 40-80 ft. high; trunk long, straight, 4-6 ft. or more in diam. Leaves about 3 dm. l., deciduous, renewed in the spring at time of flowering; leaflets opposite, in 7 or 8 pairs, unequal-sided, oblong-elliptical, acuminate, base rounded, unequal, glabrous, 7-12(-15) cm. l. Calyx minutely puberulous or glabrous, about 1.5 mm. l., irregularly 5-lobed. Petals oblong, about 6 mm. l., densely puberulous with yellowish hairs. Stamens included. Ovary glabrous, stigma round-compressed, 5-furrowed on the apex. Capsule about 4 cm. l. Seed about 2.5 cm. l., wing about 1.5 cm. l.

"This is one of the most valuable timber trees of the Island. The wood is of a reddish brown colour and has a pleasant smell. The leaves, bark, and flowers of the growing tree on the contrary give out, especially

when young and after rains a most disagreeable odour. . . . As a timber it is superior to pitch-pine, and is employed for similar purposes. It is particularly recommended for wainscoting rooms, and for chests and the inside work of clothes' presses and drawers, from the circumstance that vermin are not known to breed in it. This may be ascribed partly to the strong odour it exhales, and also to the bitter taste of the wood itself. . . . One of the principal purposes for which the cedar is employed, is for splitting into shingles to cover houses. They are very durable, and usually last for 15 years" (Macfadyen). In Porto Rico, according to Cook & Collins, the heavier, more compact, and darker coloured variety, called "cedro macho," is preferred to mahogany for the interior of houses;

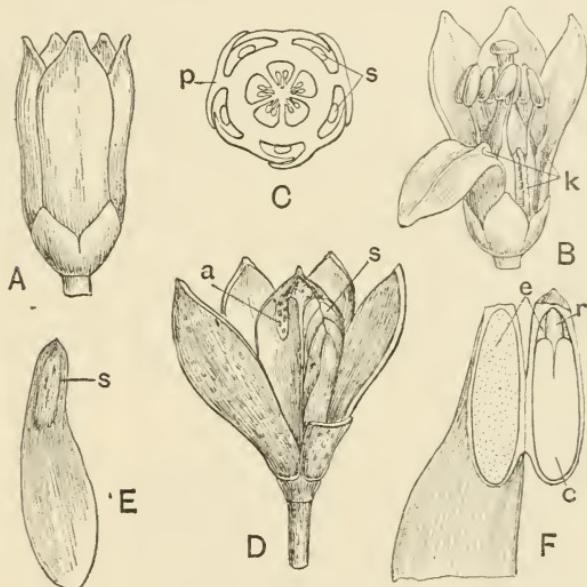


Fig. 73—*Cedrela odorata* L.

- A, Flower $\times 4$.
- B, Ditto with one petal removed; k, keel of petal attached to the ovary.
- C, Ditto cut across, enlarged, showing the attachment of the petals and stamens to ovary; s, filaments; p, petal.
- D, Capsule with one valve cut away $\times \frac{1}{2}$, showing the central column with s, seeds attached, a, placenta from which seeds have been removed.
- E, Winged seed, nat. size; s, position of embryo.
- F, Ditto cut lengthwise $\times 2$; e, endosperm; c, cotyledon; r, radicle.

the lighter, less compact, and light coloured variety, called "cedro hembra," is used extensively in making cigar boxes, as well as for the same purposes as the other variety. The weight is 28 lbs. to 39 lbs. per cubic foot.

"An amber-coloured gum, resembling gum arabic in its properties, may be obtained in considerable quantities, by making incisions in the bark" (Macfadyen).

This tree is recommended for planting systematically in odd corners of estates; it grows readily from seeds or cuttings; fresh posts put into the ground, will grow.

FAMILY XLIX. MALPIGHIACEÆ.

Trees or shrubs. Leaves opposite and entire in Jamaican species (but dentate-spiny in *Malpighia coccigera*). Inflorescence indefinite, generally terminal. Flowers hermaphrodite. Calyx 5-cleft, imbricate, 4(–5) of the lobes with 2 glands outside, rarely wanting. Petals 5, clawed, convolute. Stamens 10, hypogynous or almost perigynous; filaments generally more or less united at the base. Carpels 3, more or less united into a 3-celled ovary, or separate, each with one ovule. Styles 3, separate, but united into one style with a 3-lobed stigma in *Bunchosia*. Ovules ascending from a broad pendulous funicle, straight or curved; raphe ventral; micropyle superior. Fruit sometimes more or less fleshy (drupe) containing a single 3-celled stone, or 2 or 3 (or 1) separate stones, each with one seed (pyrenes); sometimes more or less dry, either a capsule with each of its 3 segments opening, or each carpel, when ripe, is dry and winged, not splitting open (samara). Seed hanging obliquely from below the apex of the cell.

Species, nearly 600, of which the greater part are natives of Brazil and Guiana, the rest of tropical America, Africa, and Asia, very few being found in warm regions beyond the tropics of N. and S. America and of S. Africa.

§ 1. Erect shrubs or trees. Fruit a drupe.

Filaments bearded at the base. Styles free.

Drupe with a single 3-celled stone 1. *Byrsonima*.

Filaments glabrous. Styles free. Drupe with
3 (or 2) crested pyrenes 2. *Malpighia*.

Filaments glabrous. Styles united. Drupe
with 3 (2–1) smooth pyrenes 3. *Bunchosia*.

[§ 2. Erect shrub. Leaves with 2 glands on the margin
near the base. Fruit a capsule *Thryallis*.]

§ 3. Woody trailing climbers, growing over rocks and
trees. Fruit: carpels 3(–1), separate, not
opening, each with a single dorsal wing or
crest.

Wing thickened on the lower margin 4. *Heteropteris*.

Carpels crested, not winged 5. *Brachypterus*.

Wing thickened on the upper margin 6. *Stigmaphyllon*.

§ 4. Woody trailing climbers, growing over rocks and
trees. Fruit: carpels 3(–1), separate, not
opening, laterally winged as well as dorsally
winged or crested.

Wing 3-lobed, Y-shaped 7. *Tripteris*.

Wings 4, diverging, X-shaped 8. *Tetrapteris*.

Wings obversely deltoid or semicircular 9. *Mascagnia*.

1. BYRSONIMA L. C. Rich. ex Juss.

Trees or erect shrubs. Leaves without glands; stipules
usually united in the axil, persistent. Inflorescence a terminal

raceme in which the flowers are often geminate, the pair sometimes springing from a single pedicel. Calyx persistent, with 10 large sessile glands. Petals yellow, red, or purplish, clawed, blade roundish to kidney-shaped, 4–6 mm. in diam. Filaments hairy at the base, more or less slightly united. Ovary 3-celled; styles 3, distinct; stigmas acute. Drupe with a 3-celled stone; endocarp bony or woody, with sharp angles on the outside. Embryo curled; cotyledons linear, terete.

Species about 100, natives of tropical America, including the West Indies.

Inflorescence tomentose.

Bracts not more than 4 mm. l.

Pedicels of open flower over 8 mm. l. Petals yellow 1. *B. coriacea*.

Pedicels not over 8 mm. l. Petals rosy-pink.

Leaves leathery, glabrous 2. *B. Craigiana*.

Leaves papery, puberulous 3. *B. Smallii*.

Bracts foliaceous, to 1 cm. l. 4. *B. bracteata*.

Inflorescence glabrous or with a few silky hairs 5. *B. glaberrima*.

1. *B. coriacea* DC. *Prodr. i.* 580 (1824); leaves variable in shape and in presence or absence of hairs, elliptical, oblong-elliptical to lanceolate, or sometimes obovate, apex acute or obtuse or shortly acuminate, base wedge-shaped, papery, glabrous

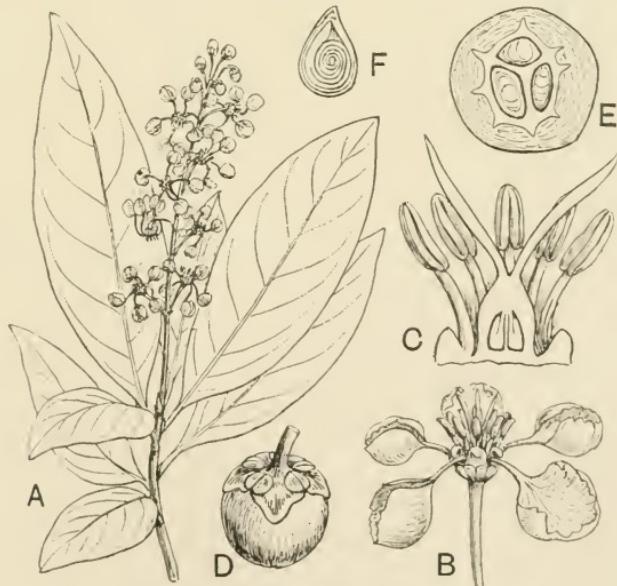


Fig. 74.—*Byrsonima coriacea* DC.

A, Portion of branch with leaves and flowers $\times \frac{1}{2}$.

B, Flower $\times 1\frac{1}{2}$.

C, Flower, with calyx and corolla removed, cut lengthwise $\times 4$.

D, Fruit, nat. size.

E, Fruit cut across $\times 1\frac{1}{2}$.

F, Seed cut lengthwise, enlarged.

(F after Jussieu.)

on both sides, or upper surface pubescent at base of midrib, lower surface pubescent on midrib, nerves and veins, or the whole lower surface tomentose, 5–13 cm. l.; inflorescence tomentose; bracts: floral ovate or ovate-acuminate, tomentose, or with silky hairs, or glabrescent, 2–4 mm. l., at base of peduncle linear, to 11 mm. l.; pedicels 8–12 mm. l.; petals yellow; ovary with adpressed silky hairs.—*Macf. Jam. i.* 147; *Griseb. Fl. Br. W. Ind.* 114. B. Berteroana A. Juss. in *Ann. Sc. Nat. sér. 2, xiii.* 333 (1840) & *Arch. Mus. Par. iii.* 293 (1843); Niedenzu in *Ind. Lect. Lyc. Brunsb., Byrson. i.* 6, & *Arb. Inst. Braunsb., Byrson. ii.* 4. B. cinerea DC. loc. cit.; *Griseb. loc. cit.* B. crassifolia H.B.K. vars. *cinerea* and *jamaicensis* Niedenzu in *Arb. Inst. Braunsb., Byrson. ii.* 15 (1901); *Small in N. Amer. Fl.* xxv. 168. Tiliæ affinis laurifolia &c. *Sloane Cat.* 136 & *Hist. ii.* 20, t. 163, f. 1. *Malpighia arborea* floribus &c. and *M. arborea* foliis &c. *Browne Hist. Jam.* 230, 231 (excl. syn. *Baccifera* &c.). *Malpighia crassifolia* L. Sp. Pl. 426 (1753) (in part); *Wright Mem.* 274. *M. coriacea* Sw. *Prodr.* 74 (1788) & *Fl. Ind. Occ.* 854. *M. cinerea* Poir. in *Lam. Encycl. Suppl. iv.* 7 (1816). (Fig. 74.) Specimen from Browne in Herb. Linn.

Locus-berry tree (Browne), Lotus-berry tree (Macfadyen), Locust tree, Hog-berry tree.

In fl. June–Aug.; *Sloane Herb.* v. 69 and 92 (in part)! *Browne!* *Wright!* *Broughton!* *Shakspear!* *Bancroft!* Port Royal Mts., *Macfadyen!* also *Purdie!* Guys Hill, *McNab!* *Wilson!* Union Hill, Moneague, *Prior!* *March!* J.P. 689, Jenman! J.P. 1291, *Bot. Dept.!* Green Valley, Port Royal Mts., *Bot. Dept.!* Berwick; Chesterfield; Lancaster, Portland, 2500–3000 ft.; Mabess R.; Olive R., 3000 ft.; near Troy, 2000 ft.; *Harris!* Fl. Jam. 5226, 5321, 6328, 7406, 7699, 8411, 8755, 9093.—West Indies, northern S. America.

Tree 10–30 ft. high. Leaves: nerves and veins slightly prominent beneath; petiole tomentellous, 1–1·5 cm. l.; stipules ovate, blunt, 2·5–3 mm. l. Inflorescence 5–9 cm. l. Sepals ovate, somewhat puberulous, about 4 mm. l.; glands about half as long. Petals: blade 4–5 mm. l., claw about as long. Anthers glabrous or with a few hairs. Drupe globular, about 1 cm. in diam., edible.

2. B. Craigiana Fawc. & Rendle in *Journ. Bot. lv.* 270 (1917); leaves broadly elliptical or roundish or obovate-elliptical, apex rounded or very obtuse, base rounded or obtuse, leathery, glabrous, 4–7 cm. l., 2–5·5 cm. br.; inflorescence brown-tomentose; bracts linear from an ovate base, brown-tomentose or glabrescent, about 3 mm. l.; pedicels 3–8 mm. l.; petals rosy-pink, drying purplish; ovary glabrous.—B. glaberrima *Small tom. cit.* 167 (1910) (non Niedenzu). Type in Herb. Jam.

In fl. May–July, in fr. Sept.; near Troy, 2000 ft.; Peckham, Clarendon, 2500 ft.; *Harris!* Fl. Jam. 9411, 10,976, 11,026, 11,042, 12,794, 12,802, 12,806.

Tree 15–40 ft. high; young twigs brownish-tomentose. Leaves brownish when dry, young leaves with brownish hairs, adult leaves quite glabrous; lower surface of lighter colour than upper, midrib prominent, nerves not

prominent, somewhat obscure; petiole 3–5 mm. l., canaliculate and glabrescent on the upper side; stipule lanceolate, 5 mm. l. *Racemes* 3–7(–11) cm. l.; peduncle about 3 cm. l. *Sepals* 4·5–5 mm. l.; glands about half as long; segments above glands ovate-oblong, puberulous. *Petals*: blade 4 mm. l., 6 mm. br.; claw 4 mm. l. *Filaments* 3 mm. l., with few hairs; anthers oblong, glabrous, 1·5 mm. l. *Drupe* (? mature) globular, 6–7 mm. in diam.

This species is named after Mr. Robert Craig, late of Savoy, Clarendon, who has helped by sending specimens for examination and in other ways in connection with the "Flora of Jamaica."

3. *B. Smallii* Fawc. & Rendle in *Journ. Bot. lv.* 270 (1917); leaves broadly elliptical, somewhat obovate, apex rounded, base obtuse or rounded, papery, upper surface more or less puberulous, midrib puberulous on both sides, lower surface otherwise glabrous, 3–6 cm. l., 2·2–3·5 cm. br.; inflorescence brown-tomentose; bracts ovate-oblong, glabrous on the inner side, brown-tomentose on the outside, 4 mm. l.; pedicels about 6 mm. l.; petals deep rose-pink when dry; ovary glabrous.—*B. Berteroana* Small in *N. Amer. Fl. xxv.* 167 (1910) (non *A. Juss.*). Types in Herb. Mus. Brit. and in Herb. Jam.

Wild Cashew.

In fl. Aug.; near Troy, 2000 ft., Harris! Fl. Jam. 8763.

Tree 16 ft. high. *Leaves*: nerves and veins very obscure on upper surface, conspicuously veined beneath, not prominent; petiole 8–11 mm. l., brown-tomentose; stipules ovate, blunt, brown-tomentose, 1·5–2 mm. l. *Racemes* 4 cm. l.; peduncles 3–4 cm. l. *Sepals* 4 mm. l.; glands 2 mm. l.; portion above the glands triangular-ovate, obtuse, brown-tomentose. *Petals*: blade 3–4 mm. l., 5–7 mm. br.; claw 3–4 mm. l. *Anthers* glabrous, about 1·3 mm. l. *Drupe*s not seen.

4. *B. bracteata* Fawc. & Rendle in *Journ. Bot. lv.* 269 (1917); leaves elliptical, apex blunt or somewhat rounded, base obtuse or wedge-shaped, papery, glabrous, 7–9·5 cm. l., 3·5–4·5 cm. br.; inflorescence brown-tomentose; bracts foliaceous, narrowly elliptical-oblong, base narrowing and sometimes somewhat stalked, glabrous inside, more or less puberulous or glabrescent on the outside, to 1 cm. l.; pedicels very short; ovary glabrous.

Flowers in bud in Sept.; Peckham, Clarendon, 2500 ft., Harris! Fl. Jam. 11,202.

Shrub 9 ft. high. *Leaves*: nerves and veins obscure on upper surface, conspicuously net-veined beneath, not prominent; petiole 6–8 mm. l., glabrous; stipules ovate, with brownish hairs on the outside, especially on the margin, 3·5 mm. l. *Racemes* 4–6 cm. l.; peduncles about 2·5 cm. l. *Anthers* glabrous.

5. *B. glaberrima* Niedenzu in *Arb. Inst. Braunsb.*, *Byrsonima* 43 (1901): leaves elliptical, or some ovate or obovate, obtusely acuminate, base obtuse or acute or shortly narrowed, generally unequal-sided, papery and greenish when dry, glabrous, 3·5–6 cm. l., 2–3·5 cm. br.; inflorescence glabrous or with a few

silky hairs; bracts oblong or linear-oblong, glabrous, 4–6 mm. l.; pedicels 7–13 mm. l.; petals purplish when dry; ovary glabrous.—*B. coriacea* *Small tom. cit.* 167 (1910) (non DC.). Type in Herb. Wullschlaegel.

In fr. Sept.; *Wullschlaegel*; New Green, near Mandeville, 2100 ft. (in fr. only), *Harris & Britton!* Fl. Jam. 10,595.

Shrub or *tree* to 30 ft. high, glabrous in all parts, except a few hairs on the inflorescence. *Leaves*: midrib a little prominent, nerves scarcely prominent; petiole glabrous, 4–8 mm. l.; stipules roundish, 1 mm. l. *Racemes* 3–6 cm. l., at the end of twigs with several leaves, the leaves at the end minute or bract-like and about 1 cm. from the lowest flowers. *Flowers* scarcely 1·5 cm. in diam. *Sepals* ovate, glabrous, apex recurved, about 5 mm. l.; glands slightly more than half as long. *Petals*: blade 3–4 mm. l., 6 mm. br., claw 4–5 mm. l. *Filaments* 3 mm. l., with a few hairs; anthers glabrous, 1·5 mm. l. *Drupe* globular, about 1 cm. in diam.

The description of the flower is from Niedenzu.

2. MALPIGHIA L.

Shrubs or small trees. Leaves without glands, sometimes with stinging hairs, margin entire or sinuate-dentate (in *M. coccigera*); stipules minute, deciduous. Flowers in axillary and terminal umbels or corymbs, rarely solitary. Calyx 6–10-glandular. Petals red, or purplish, or white; limb roundish. Filaments glabrous. Styles 3, distinct, apex truncate or with a foot-like appendage beyond the stigma. Drupe with the flesh at length drying up, releasing 3 pyrenes, each with 3–5 dorsal crests.

Species 23, natives of the West Indies and tropical continental America.

§ 1. Margin of leaves entire.

Leaves glabrous.

Leaves membranous or papery, 2–8 cm. l.

Umbels pedunculate 1. *M. glabra*.

Umbels sessile or subsessile 2. *M. punicifolia*.

Leaves somewhat leathery, 7–12 cm. l. 7. *M. Harrisii*.

Leaves with stinging hairs beneath.

Umbels sessile or subsessile. Drupe subglobose.

Leaves to 20 cm. l. Drupe to 1·5 cm. in diam. 3. *M. fucata*.

Leaves to 10 cm. l. Drupe 8–10 mm. in diam.

Petals with keel not free at apex 4. *M. urens*.

Petals with keel to 1 mm. br., free at apex 5. *M. incana*.

Umbels pedunculate. Drupe triangular-pyramidal 6. *M. biflora*.

§ 2. Margin of leaves sinuate-dentate with spines 8. *M. coccigera*.

§ 1. Margin of leaves entire.

1. *M. glabra* L. *Sp. Pl.* 425 (1753) & *Amoen. v.* 379; leaves glabrous, ovate-elliptical to lanceolate, sometimes elliptical, apex

acute or acuminate (rarely obtuse), subsessile, 3–8 cm. l.; flowers in 8–3-flowered corymbs or umbels; common peduncle and pedicels somewhat equal in length, 5–15 mm. l.; petals one larger than the rest, 2 smaller than the intermediate; drupe to 1 cm. in diam., pyrenes,* outline oblong- or ovate-elliptical, 3-crested; spaces between the crests with transverse anastomosing ridges; commissural ridge longer than the crests, projecting beyond them at base.—*Mill. Gard. Dict. ed. 8 & Ic. t. 181, f. 2; Cav. Diss. 406, t. 234, f. 1; Bot. Mag. t. 813; Macf. Jam. i. 146;*

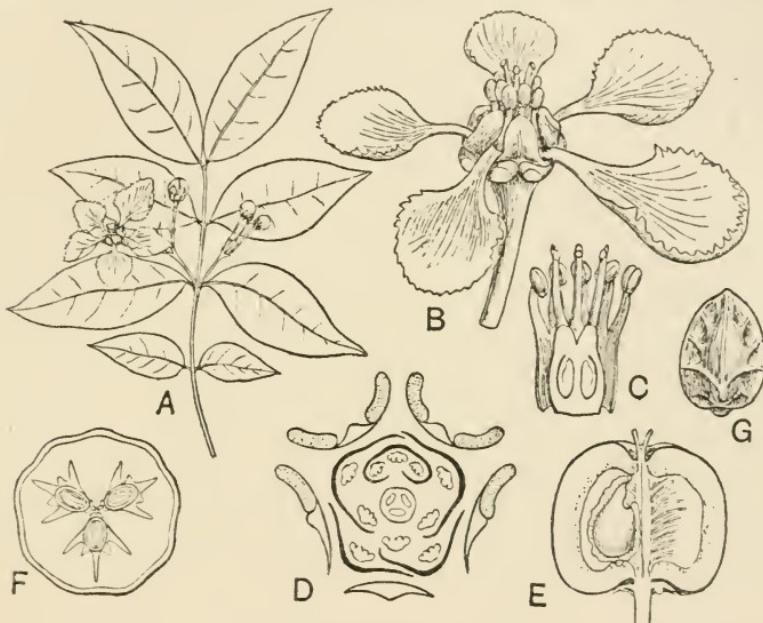


Fig. 75.—*Malpighia glabra* L.

- | | |
|---|---|
| A, Branch with leaves and flowers $\times \frac{1}{2}$. | E, Fruit cut lengthwise, showing seed and embryo $\times 2$. |
| B, Flower $\times 3$. | F, Fruit cut across $\times 2$. |
| C, Flower with calyx and corolla removed, cut lengthwise $\times 5$. | G, Pyrene $\times 2$. |
| D, Diagram of flower. | (D, E, F after Jussieu.) |

*A. Juss. in Arch. Mus. Par. iii. 262; Griseb. Fl. Br. W. Ind. 116; Niedenzu in Ind. Lect. Lyc. Brunsb., *Malpighia*, 5; Small in N. Amer. Fl. xxv. 155. M. fruticosa erecta foliis nitidis &c. Browne Hist. Jam. 230. M. nitida Mill. Gard. Dict. ed. 8 (1768) (non L.). Arbor baccifera folio subrotundo &c. Sloane Cat. 172 & Hist. ii. 106, t. 207, f. 2. (Fig. 75.) A specimen from Hort. Cliff. in Herb. Mus. Brit., one also in Herb. Linn. named by Linnaeus.*

* The description of the pyrenes is taken from them when thoroughly cleaned from the adhering flesh.

Cherry.

Sloane Herb. vii. 32! *Wright!* *Broughton!* *Shakspear!* *Macfadyen!* St. Mary, *McNab!* Port Royal Mts., *Purdie!* March! Port Morant, Lucea, *Hitchcock*; St. Andrew, *Campbell!* Cane River valley, above Falls, *Fawcett!* Bridge Hill, *Fawcett!* Westphalia; Berwick Hill; Sheldon Road, 2500 ft.; Grove, 800 ft.; Tweedside, south St. Andrew, 2500 ft.; near Alligator Pond, 300 ft.; Watson's Hill, 2200 ft.; Long Mountain, 900 ft.; coast between Montego Bay and Lucea; Malvern, 2200 ft.; *Harris!* Fl. Jam. 5378, 5400, 5459, 6087, 6094, 6621, 6922, 7265, 8202, 8620, 8848, 8913, 9235, 9646; Lime Hall, *Ornsby!* near Montego Bay, *Mrs. E. G. Britton*, 2919! Spur Tree Hill, *Britton*, 1057!—West Indies and tropical continental America.

Shrub 4–10 ft. high, or (in cultivated ground) *tree* to 20 ft. high; young parts more or less covered with silky hairs. *Sepals* oblong to ovate-oblong, glabrous, 2·5 mm. l., glands about half as long. *Petals* rosy-pink, denticulate, to 8 mm. l.; limb roundish or elliptical, longer than the claw. *Styles* subequal, straightish, thickened at apex. *Drupe* scarlet, globular-3-angled, juicy of a sweet but insipid taste.

2. *M. punicifolia* *L.* *Sp. Pl. ed. 2*, 609 (1762); leaves glabrous, elliptical, or somewhat obovate-elliptical, or sometimes ovate-lanceolate, apex generally obtuse or rounded or emarginate, subsessile, 2–8 cm. l.; flowers 2–1(–4) in sessile or subsessile corymbs or umbels; styles thicker at apex; drupe 1–1·5 cm. in diam., ovoid; pyrenes, outline roundish, 3-crested; crests thin, equal in length, the spaces between with transverse ridges with muricate edges; commissural ridge broad with sharp edges, much shorter than the crests at the base.—*Descourt. Fl. Ant.* i. 145, t. 30; *Wright Mem.* 271; *Macf. Jam.* i. 147; *A. Juss. tom. cit.* 261, t. 4; *Griseb. loc. cit.*; *Niedenzu tom. cit.* 7; *Small tom. cit.* 156. *M. foliis ovatis &c. Plum. Pl. Amer. (Burm.)* t. 166, f. 2. *M. fruticosa erecta ramulis &c. Browne Hist. Jam.* 230. *M. uniflora Tuss. Fl. Ant. iii. t. 27* (1824).

Cherry.

Macfadyen! St. Andrew; St. Ann; *McNab!* J.P. 621, *Morris!* Red Hills, *Grabham!* Long Mountain, 50 ft., *Harris!* Fl. Jam. 9573.—West Indies (but not reported from Cuba and Hispaniola), northern S. America.

Shrub or *tree*, 7–16 ft. high, much like the preceding species. *Petals* slightly keeled, roundish, somewhat broader than long. *Stamens*: two thicker and larger than the rest.*

3. *M. fucata* *Ker in Bot. Reg. t. 189* (1817); leaves large, with stinging hairs (3–7 mm. l.) beneath, elliptical or oblong (some also ovate or obovate or lanceolate), obtuse or acute at both ends, to 20 cm. l., to 11 cm. br.; petiole 5–10 mm. l.; flowers 9–20 in sessile or subsessile corymbs; pedicels 1–2·5 cm. l.; drupe to 1·5 cm. in diam.; pyrenes, outline roundish, 3-crested; crests thin, the middle of the spaces between the wings with short transverse ridges, which in the dry fruit form, as it were, intermediate crests parallel to the crests; commissural ridge thick and broad, equalling the crests at the base.—*A. Juss. tom.*

cit. 256; *Griseb. op. cit.* 117; *Niedenzu tom. cit.* 11; *Urb. Symb. Ant.* iv. 332; *Small tom. cit.* 157. *M. macrophylla Desf. Cat. Hort. Par. ed.* 3, 232 (1829).

New Green, Manchester, Purdie!—Porto Rico, Crab Is., St. Cruz.

Shrub 6–16 ft.; young twigs compressed, glabrous. *Sepals* ovate, 3–4·5 mm. l.; glands 10, 2–3 mm. l. *Petals* keeled, pale pink; one spathulate, larger than the rest, the others with limb somewhat semi-circular.

4. *M. urens L. Sp. Pl.* 426 (1753); leaves with stinging hairs (3–6 mm. l.) beneath, parallel with midrib, otherwise glabrous, usually whitish-grey beneath, elliptical or oblong-elliptical, apex acute or obtuse, base rounded to subcordate, papery, subsessile, 2–11 cm. l., 1–4 cm. br.; flowers 4–5 (2, 3) in sessile or subsessile corymbs or umbels; pedicels 1–2 cm. l.; petals keeled, 7–9 mm. l., blade of one petal roundish, 5–6 mm. in diam., of the rest subcordate, 4–5 mm. l., keel of petal not so broad as in *M. incana*, not free at apex; apex of styles foot-like or hammer-like; drupe 8–10 mm. in diam., subglobular; pyrenes, outline oblong-elliptical, 3-crested, crests thin, apex of middle crest distinct from lateral crests, spaces between with transverse ridges; commissural ridge as long as crests, slightly projecting at base.—*Mill. Gard. Dict. ed. 8 & Ic. t.* 181, *f. 1*; *Cav. Diss.* 407, *t. 235, f. 1*; *Descourt. Fl. Ant.* viii. 234, *t. 569*; *A. Juss. tom. cit.* 257; *Griseb. op. cit.* 116; *Small tom. cit.* 158. *M. viminea* &c. *Browne Hist. Jam.* 229. *M. martinicensis Jacq. Enum. Pl. Carib.* 21 (1760) & *Sel. Stirp. Amer.* 136; *Niedenzu tom. cit.* 13. Arbor baccifera folio oblongo subtilissimus &c. *Sloane Cat.* 172 & *Hist. ii.* 106, *t. 207, f. 3*. Type in *Herb. Linn.*, cultivated in *Hort. Upsal.*, named by Linnaeus.

Cowhage or Cowitch Cherry.

Near St. Jago de la Vega, *Sloane Herb.* vii. 33! *Houstoun!* *Browne!* *Wright!* *Broughton!* *March!* Portland Gap; above Abbey Green, 5000 ft.; *Harris!* *Fl. Jam.* 5016, 5783, 5890, 5954.—West Indies.

Shrub 5–15 ft. high. *Sepals* ovate or ovate-lanceolate, about 2 mm. l.; glands 6, 8, or 10, 1·5 mm. l. *Petals* purple.

5. *M. incana Mill. Gard. Dict. ed. 8* (1768), leaves with stinging hairs (1–3 mm. l.) beneath, parallel with midrib, more or less persistent, otherwise glabrous, whitish-grey beneath, narrowly elliptical-oblong to lanceolate, apex very acute or acuminate (some blunt), more or less mucronulate, base wedge-shaped to obtuse, papery, subsessile, 3–6 cm. l., 1–2 cm. br.; flowers 3–7 in subsessile corymbs; peduncle 3–4(–6) mm. l.; pedicels 8–14 mm. l.; petals helmet-shaped, subequal, limb 3–4 mm. l., broadly keeled on the back; keel wing-like to 1 mm. br., with curved free apex; drupe 8–10 mm. in diam., subglobular, 9-ribbed; pyrenes, outline roundish, 3-crested;

crests equal in length, lateral broader, middle crest thick, the spaces between with more or less prominent irregular transverse ridges; commissural ridge shorter than the crests at the base, sharp-pointed at the apex.—*Niedenzu tom. cit. 12*; *Small tom. cit. 157*. Miller's specimen, the type, is in Herb. Mus. Brit.

Sloane Herb. vii, opp. 32! *Browne*! *Wright*! Halfway Tree to Spanish Town, 200 ft., *Harris*! Fl. Jam. 10,048.—Cuba, Mexico.

The specimen from Browne in the Linnean Herbarium is named *M. angustifolia* by Linnæus. But *M. angustifolia* L. is *M. linearis* Jacq., a species with much narrower leaves, which is found only in the Lesser Antilles.

Sepals ovate or ovate-lanceolate, 2·5–3 mm. l.; glands 6, about 2 mm. l.
Petals purple.

6. *M. biflora* Poir. in Lam. *Encyc. iv.* 326 (1797); leaves with stinging hairs (2–6 mm. l.) beneath, parallel with midrib, otherwise glabrous, elliptical or elliptical-oblong to lanceolate, apex acute to acuminate, base obtuse, membranous or papery, sessile, 2–12 cm. l.; flowers 2–5, in stalked corymbs (or umbels); peduncle 15–4 mm. l.; pedicels 6–20 mm. l.; blade of one petal roundish, 6–7 mm. l., claw 3–5 mm. l., limb of the rest subhastate-ovate, 3–5 mm. l., claw 2–3 mm. l.; drupe about 8 mm. l. and in diam. at base, when dry triangular-pyramidal with 9 prominent crests; pyrenes 3-winged, the median wing longer and usually much broader than the lateral wings, in the spaces between transverse raised lines, parts of which sometimes become warty; commissural ridge subequal or somewhat shorter than the wings at the base.—*Small tom. cit. 158*. *M. punicifolia* Cav. *Diss. 406, t. 134, f. 2* (1789) (non L.). *M. urens* Macf. *Jam. i. 146* (1837) (non L.). *M. oxycocca* Griseb. *op. cit. 117* (1859); *Niedenzu tom. cit. 13*. Type of *M. oxycocca* Griseb. in Herb. Kew.

Cowhage or Cowitch Cherry.

Wright! woods near Bath, *Purdie*! *Wilson*; *Prior*; above Gordon Town; Windward Road; Cinchona; *Fawcett*! road to Troy, 1400 ft.; Cave river valley, 400 ft.; Mulgrave, 1200 ft.; *Harris*! Fl. Jam. 9409, 9625, 12,372.—Cuba.

Shrub 3–8 ft. high; youngest twigs villose with adpressed white hairs, older glabrescent, at length glabrate. *Sepals* ovate, obtuse, puberulous or glabrate, villose at base or just below glands, 2·5 mm. l.; glands 6, 2 mm. l. *Petals* purplish.

7. *M. Harrisii* Small in *Torreya xiii.* 77 (1913); leaves glabrous, elliptical to broadly elliptical, apex obtuse, sometimes rounded or acute, base rounded, somewhat leathery, 7–12 cm. l., 4–6·5 cm. br.; petiole 4–7 mm. l.; racemes clustered, subcorymbose, many-flowered, pedunculate; pedicels jointed, lower joint 5–6 mm. l., upper 2·5–1·5 cm. l.; petals to 12 or 13 mm. l.; apex of styles hammer-shaped.

Peckham Woods, Upper Clarendon, 2500 ft., Harris! Fl. Jam. 11, 189.
Slender shrub, 12 ft. high. Sepals oblong, about 3 mm. l.; glands 6, about 2 mm. l. Petals rose-coloured. Styles, 2 larger than the third. Drupes not known.

§ 2. Margin of leaves sinuate-dentate, with the teeth ending in spiny bristles.

8. *M. coccigera* L. *Sp. Pl.* 436 (1753); *Jacq. Ic. Pl. Rar.* t. 470; *Griseb. loc. cit.*; *Niedenzu tom. cit.* 19; *Small tom. cit.* 160. *M. humilis ilicis cocci-glandi feræ foliis* *Plum. Gen.* 46, *Pl. Amer. (Burm.)* t. 168, f. 2 & *Ic. ined. ii.* 128. *M. coccigrya* *L. Sp. Pl. ed. 2,* 611 (1762). *M. coccifera* *Car. Diss.* 408, t. 235, f. 2 (1789); *Bot. Reg. t.* 568.

Wright!—Cuba, Hispaniola, Porto Rico, Dominica, Martinique, St. Lucea, St. Vincent.

Shrub about 3 ft. high. Leaves small, 1·7–2 cm. l., roundish or roundish-elliptical, teeth large, coarse, spines 1·5–2 mm. l., forming a continuation of the tooth, upper surface shining, with nerves and veins prominent, lower surface with nerves and veins scarcely visible, sessile or subsessile, margin recurved. Flowers solitary, or 2 on a short peduncle, pedicels jointed, 1·5–2 cm. l. Sepals oblong or ovate-oblong, about 3 mm. l.; glands 6, more than half as long. Petals pink, to about 1 cm. l. Drupe somewhat globular, 9 or 10 mm. in diam., red.

3. BUNCHOSIA L. C. Rich. ex Juss.

Leaves usually with 2 glands on the lower surface a little above the base; stipules minute, sometimes united into one. Inflorescence an axillary raceme. Calyx persistent, with 8 to 10 sessile glands (in Jamaican species), about half as long as the calyx. Petals yellow. Filaments glabrous, united at the base. Ovary 2–3-celled; styles united, with a triangular stigma. Drupe, the flesh drying up, releasing the pyrenes; pyrenes 2–3 (rarely 1), without crests.

Species 32, natives of the West Indies and tropical continental America.

Leaves narrowly elliptical, to 10 cm. l.

Leaves seldom shortly acuminate, to 7·5 cm. l.

Racemes usually as long as, or longer than the leaves..... 1. *B. Swartziana*.

Leaves generally shortly acuminate, to 10 cm. l.

Racemes usually somewhat shorter than the leaves..... 2. *B. media*.

Leaves broadly elliptical, to 16 cm. l. 3. *B. jamaicensis*.

1. *B. Swartziana* *Griseb. Fl. Br. W. Ind.* 115 (1859); leaves narrowly elliptical to elliptical, occasionally shortly acuminate, tapering to the base, 3–7·5 cm. l.; racemes usually as long as,

or longer than, the leaves; inner petal spatulate, claw margined, the rest with ovate toothed blades; connective yellow, much shorter than the anther-cells; ovary 3-celled.—*Niedenzu* in *Ind. Lect. Lyc. Brunsb.*, *Bunchosia*, 4; *Small* in *N. Amer. Fl.* xxv. 161. *B. media* Macf. *Jam. i.* 149 (1837) (non DC.). *Malpighia humilis* &c. *Browne Hist. Jam.* 230? *Malpighia nitida* Sw. *Obs. Bot.* 180 (1791) (non L.). (Fig. 76.)

Wright! *Bancroft!* between Green Valley and Tweedside, *Macfadyen!* *Wullschlaegel!* March! Port Henderson; Rock Fort; *Campbell!* New

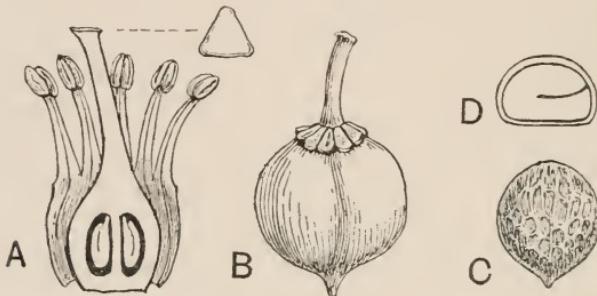


Fig. 76.—*Bunchosia Swartziana* Griseb.

A, Flower, calyx and corolla removed, cut lengthwise $\times 7$; with a separate enlarged view of the stigma seen from above.
 B, Drupe, nat. size.
 C, Pyrene $\times 1\frac{1}{2}$.
 D, Ditto cut across.

Forest, 50 ft.; Long Mountain, south and west, 280-700 ft.; Cane river valley, 300 ft.; Chelsea Hill, Santa Cruz Mts., 2200 ft.; between Malvern and Mountain Side, 400 ft.; Green Island, Fish river; *Harris!* Fl. Jam. 6051, 6525, 8173, 8861, 9604, 9633, 9689, 9916, 10,256.

Shrub 3-10 ft. or small tree, to 15 ft. high. Leaves usually with two glands beneath, 1-2 cm. from the base. Pedicels pubescent in flower, then glabrate. Calyx: glands 8 obovoid, 1-2 mm. l.; sepals oblong, ciliate, longer than the glands by 1.5-2 mm. Petals 5-7 mm. l. Filaments united at base to $\frac{1}{3}$ their length. Ovary glabrous; styles and stigmas united, glabrous. Drupe somewhat globular, furrowed, 3-lobed, 6-10 mm. in diam., scarlet.

2. *B. media* DC. *Prodr. i.* 581 (1824); leaves narrowly elliptical to elliptical, generally shortly acuminate, base wedge-shaped, 4-10 cm. l.; racemes usually somewhat shorter than the leaves; inner petal about equal to the rest which are roundish; connective yellow, much shorter than the anther-cells; ovary 3-celled.—*Griseb. loc. cit.*; *Niedenzu* tom. cit. 9; *Small* tom. cit. 163. *Malpighia media* Ait. *Hort. Kew. ed. 2, iii.* 103 (1811). *Malpighia nitida* Sw. *Obs. Bot.* 180 (1791) (non Jacq.) probably belongs to this species, but Swartz mentions "3 styles."

Wright! *Masson!* *Swartz* (fide Niedenzu); *Macfadyen!* *Distin!* *Cuming!* Robins Bay, St. Mary, *McNab!* Great Valley, Manchester, *Purdie!* *Wilson!* *Wullschlaegel!* Mamnee Bay, *Prior!* March! *Lucea,*

Hitchcock; Red Hills, Graham! Annotto Bay, Thompson! between Fontabelle and Galloway, Mrs. E. G. Britton, 2867! Red Hills; Hope Grounds; Great Pedro Bay; Stanmore Hill, 2200 ft.; Peckham, 2300 ft.; Harris! near Salt Ponds, Harris & Britton! Fl. Jam. 6902, 8602, 9709, 9951, 10,552, 11,080.—Cuba.

Shrub 5–10 ft. high. Leaves with 2 glands 1–2 cm. above the base beneath. Pedicels pubescent in flower and fruit. Calyx: glands 10–8, oblong, 2–2.5 mm. l.; sepals oblong, ciliate, longer than the glands by 1.5–2 mm. Petals 7–9 mm. l., blades about 4 mm. l. Filaments united to about $\frac{1}{4}$ of their length. Ovary glabrous; styles and stigmas united, glabrous. Drupe somewhat globular, 2–3-lobed, orange-yellow, 8 mm. l., 6–7 mm. in diam.

3. *B. jamaicensis* Urb. & Niedenzu ex Niedenzu in *Ind. Lect. Lyc. Brunsb.*, *Bunchosia*, 10 (1898); leaves broadly elliptical, apex rounded or obtuse, base obtuse or wedge-shaped, 10–16 cm. l., 5.5–10 cm. br.; racemes 2 together or solitary, shorter than the leaves; petals subequal, blade more or less cordate-ovate; connective purplish or brownish, slightly shorter than the anther-cells; ovary 2-celled.—*Small tom. cit.* 164. *B. Lindeniana* Griseb. *Fl. Br. W. Ind.* 115 (1859) (as regards the Jamaican plant) (non Juss.).

Manchester, Purdie! March! Prior! near Cascade River, 3000 ft.; Holly Mount, 2500 ft., Harris! Fl. Jam. 6463, 6608, 8897.

Tree 15–30 ft. high. Leaves glabrous, with or without 2 glands near the base. Sepals oblong, about 3 mm. l. Petals to 5.5 mm. l. Ovary glabrous; styles and stigmas glabrous. Drupe 2–3-lobed, somewhat globular, 11–13 mm. in diam.

[*THRYALLIS* L.]

Shrubs. Leaves glaucous, with a gland on each margin near the base; stipules (in the Jamaican species) free. Flowers in terminal racemes; pedicels jointed below the middle, with a bract at the base, and 2 bracteoles below the joint. Calyx 5-cleft, without glands. Petals yellow, subequal. Stamens 10, all perfect; filaments distinct or united at the base. Styles 3, distinct, awl-shaped, acute. Capsule 3-coccous; cocci dehiscent; epicarp slightly fleshy, endocarp hard and brittle; embryo bent round a fold of the seed-coat; cotyledons subequal, incumbent; radicle rather long.

Species about 15, natives of tropical continental America.

T. gracilis Kuntze *Rev. Gen. i.* 89 (1891); Rose in *Contrib. U.S. Herb. xii.* 280. *T. glauca* Small in *N. Amer. Fl. xxv.* 150 (1910). *Galphimia gracilis* Bartl. in *Linnæa xiii.* 552 (1839); A. Juss. in *Arch. Mus. Par. iii.* 324; Urb. *Symb. Ant. iv.* 331. *G. glauca* Griseb. *Cat. 43* (1866) (non Car.).

Naturalized; Watson Hill, Fawcett! Hope estate, 1000 ft., Harris! Fl. Jam. 8394, 11,884.—Central America, naturalized in West Indies.

Leaves narrowly elliptical, glabrous, 2–5 cm. l. *Panicles* many-flowered; rhachis pubescent with dark-red hairs or glabrescent. *Sepals* oblong, 3·5–4 mm. l. *Petals* about 1 cm. l.; blade more or less ovate. *Filaments* pinkish below, unequal, slightly united at base, 3–5 mm. l.; anthers 3 mm. l. *Cocci* 3·5 mm. l., dark green. *Seeds* dark brown, 3 mm. l., radicle prominent.]

4. HETEROPTERIS* H. B. & K.

Shrubs, trailing and twining, climbing over trees (in West Indian species). Leaves, with or without glands on the petiole; stipules inconspicuous. Flowers small, generally in panicles. Calyx usually 8-glandular. Petals yellow, 3–5 mm. in diam. Stamens unequal, all perfect; filaments united at the base. Apex of styles somewhat compressed and dilated, with a sharp point at the back. Samarae 1–3; the wing dorsal, thickened on the lower margin.

Species about 80, natives of tropical America (including the West Indies), rarely extending beyond the tropics in S. America, also a few in western tropical Africa.

Leaves leathery, 6–20 cm. l., without glands.

Panicles pyramidal. Fruit, wing elliptical..... 1. *H. laurifolia*.

Panicles: branches few, patent. Fruit sub-semi-circular 2. *H. reticulata*.

Leaves membranous, less than 6 cm. l., petiole 2-glandular about the middle 3. *H. purpurea*.

1. *H. laurifolia* A. Juss. in *Ann. Sc. Nat. sér. 2, xiii.* 276 (1840) & *Arch. Mus. Par.* iii. 458; leaves leathery, glabrous, without glands, 6–17 cm. l.; panicles terminal, pyramidal, branches racemose; wing of fruit elliptical, narrowed near the base, with a triangular projection near the base on the upper margin.—

* Linnæus (*Sp. Pl.* ed. 2, 611) includes seven species in his genus *Banisteria*. Omitting the East Indian species, of the remaining six three have the lower margin of the samara-wing thickened, and three the upper.

In 1822 Kunth (H. B. & K. *Nov. Gen. & Sp.* v. 158, 163) applied the name *Banisteria* to species with the upper margin of the wing thickened, and founded a new genus *Heteropteris* for those with the lower margin thickened.

In 1832 Jussieu founded a new genus *Stigmaphyllum* for species of *Banisteria*, as defined by Kunth, which have only six perfect stamens instead of ten, thus leaving no species in Linnæus's original enumeration of *Sp. Pl.* ed. 1 & 2. Strictly speaking Jussieu should have used the name *Banisteria* for the species which he included under his new genus *Stigmaphyllum*, i.e., for the portion of Linnæus's original *Banisteria* left by Kunth, when separating *Heteropteris*.

Grisebach, Bentham & Hooker, and Niedenzu follow Kunth and Jussieu. Small (*N. Amer. Fl.*) keeps *Banisteria* for two Linnean species and others with the lower margin thickened (giving up *Heteropteris*), and *Stigmaphyllum* for those with the upper margin thickened and six perfect stamens.

Griseb. Fl. Br. W. Ind. 119; *Niedenzu in Arb. Inst. Braunsb., Heteropteryx*, 51, 52; *Urb. Symb. Ant.* iv. 329. *Acer benghalense* &c. *Pluk. Phyt.* t. 3, f. 1; *Alm.* 7. *Acer scandens* foliis lauriniis *Sloane Cat.* 137 & *Hist.* ii. 26. *Banisteria* foliis ovato-oblongis acuminatis *Plum. Pl. Amer. (Burm.)* t. 14. *B. foliis ovatis,* seminibus unialatis &c. *Browne Hist. Jam.* 231 (excl. syn.). *B. laurifolia L. Sp. Pl. ed.* 2, 611 (1762); *Gærtn. Fruct.* ii. 167, t. 116; *Sw. Obs. Bot.* 182; *Wright Mem.* 271; *Macf. Jam. i.* 152; *Small in N. Amer. Fl.* xxv. 137. *B. angulosa Mill. Gard. Dict.* ed. 8 (1768) (non *L.*). *B. cœrulea Lam. Encyc. i.* 367 (1783); *Cav. Diss.* 421, t. 243. (Fig. 77.)

The type, Miller's specimen, is in Herb. Mus. Brit.

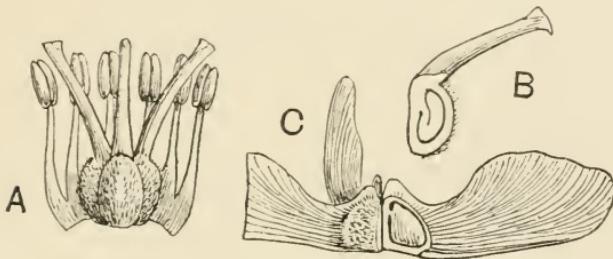


Fig. 77.—*Heteropteris laurifolia* A. Juss.

A, Pistil and six stamens $\times 3$.
 B, Median carpel of A showing the style
 somewhat different from the others ;
 C, Fruit, one samara cut to show the seed,
 nat. size.

Dragon Withe, White Withe.

Banks of Rio Cobre; St. Dorothy; *Sloane Herb.* v. 93! *Houstoun!* *Broughton!* *Masson!* *Bertero!* *Macfadyen!* St. Mary, *McNab!* *Hartweg!* Moneague, *Prior!* *March!* J.P. 716, *Jenman!* King's House grounds, J.P. 1081, *Hart!* Constant Spring, Blue Mts., Port Antonio, *Hitchcock!* Providence road, near Castleton, 700 ft.; Toms River, 600 ft.; *Thompson!* Mona mountain, *Fawcett!* Mount Mansfield, 800 ft.; Stony Hill, 1000 ft.; near Bardowie, 1800 ft.; Hope road; Grove bridge; near Lacovia; *Harris!* *Fl. Jam.* 5740, 5819, 5820, 6738, 8010, 8519, 8597, 9850, 11,778.—Cuba, Hispaniola, Porto Rico, St. Cruz, Central America.

Leaves elliptical, oblong, or lanceolate, apex obtuse or acute, often sub acuminate, base obtuse or wedge-shaped, sometimes rounded, veins conspicuously reticulate, prominent on both sides. Panicles to 2·5 dm. l.; reddish pubescent. Bracts and bracteoles more or less persistent, ovate to ovate-lanceolate, 3–5 mm. l. Sepals about 4 mm. l., oblong, revolute at apex, buff-pubescent, with 8 glands. Petals yellow, blade roundish to elliptical, sometimes hastate at base, 3–4 mm. l.; claw 2–3 (4) mm. l. Samarae 2·5–4 cm. l.

2. *H. reticulata* *Niedenzu in Arb. Inst. Braunsb., Heteropteryx* 54 (1903); leaves leathery, glabrous, without glands, 10–16 cm. l.; panicles terminal and axillary; branches few, spreading more or less at right angles, racemose; fruit: upper margin somewhat

semicircular, lower straight or slightly recurved at apex, base truncate.—*Malpighia reticulata* *Poir.* in *Lam. Encyc. Suppl.* iv. 8 (1816). *Banisteria reticulata* *C. B. Robinson ex Small* *tom. cit.* 138 (1910).

Banks of Black river, Lacovia, *Harris!*—Guiana.

Leaves elliptical, generally shortly acuminate, base rounded or obtuse, midrib and veins prominent especially beneath, veins conspicuously reticulate especially beneath and prominent on both sides. Panicles to nearly 3 dm. l.; reddish-pubescent. Bracts and bracteoles concave, persistent, conspicuous, ovate to oblong-ovate, 3·5–4·5 mm. l. Pedicels jointed about the middle, the upper joint with the flower often deciduous, the lower part with the bracteoles at its apex persistent, giving a characteristic appearance to the panicle. Sepals oblong, about 4 mm. l., revolute at apex, brownish-pubescent, with 8 glands; glands slightly more than half as long. Petals yellow; blade elliptical, to 5 or 6 mm. l.; claw 2–3 mm. l. Styles hooked at the apex outwardly, hook bent downwards. Fruit: wing 3·5 cm. l., 2 cm. br., when young covered with red tomentum, at length glabrate; nerves fan-like; nut to 2 cm. l. to 7 cm. br.

3. *H. purpurea* *H.B. & K.* *Nor. Gen. & Sp.* v. 164 (1822); leaves membranous, 1·5–5 cm. l.; *Griseb. op. cit.* 119; *Niedenzu op. cit.* 15; *Urb. Symb. Ant.* iv. 328. *H. parvifolia* *D.C. Prodr.* i. 591 (1824); *Griseb. loc. cit.* (*H. parviflora* in error). *Banisteria purpurea* *L. Sp. Pl.* 427 (1753); *Cav. Diss.* 423, t. 246, f. 1; *Small loc. cit.* *B. parvifolia* *Vent. Choix.* t. 51 (1803).

Near Kingston, *Oersted* (fide Grisebach).—West Indies, Venezuela, Colombia.

Leaves elliptical, apex and base rounded or obtuse, glabrous, veins reticulate beneath, scarcely visible above; petiole with 2 glands about the middle. Racemes terminal or axillary, corymbose, sparingly pubescent. Bracts and bracteoles minute. Pedicels jointed near the base. Sepals oblong to ovate-oblong, about 2·5 mm. l.; glands 8, 1·5–2 mm. l. Petals purple; blade obovate, base sagittate, 3·5–5 mm. l.; claw 1·5–2·5 mm. l. Fruit striate-veined, sparingly puberulous; wing about 2 cm. l., about 1 cm. br., obliquely obovate-oblong, with a slight projection on the upper margin near the base.

5. BRACHYPTERYS A. Juss.

Sea-shore small shrubs, erect or trailing and twining over low bushes. Leaves with 2 glands on the base of the midrib beneath: stipules very minute. Flowers, in the Jamaican species, in axillary peduncled bracteate umbel-like corymbs. Calyx 8-glandular. Petals yellow, 7–13 mm. in diam. Stamens 10, subequal or unequal. Styles produced into an appendage with the stigmatic surface on the inside. Fruit of 1 to 3 cocci, which bear a short crest at the apex. Embryo: one cotyledon not developing, the other bending over and enveloping it in its growth.

Species 2, natives of West Indies, northern S. America and central America.

B. ovata Small in *N. Amer. Fl.* xxv. 138. *B. borealis* A. Juss. in *Ann. Sc. Nat. sér. 2, xiii.* 291 (1840) & *Arch. Mus. Par.* iii. 356, t. ii. f. 16. Griseb. *Fl. Bras.* xii. 35 & *Fl. Br. W. Ind.* 117; Hemsl. in *Biol. Cent. Am. Bot.* t. 151. *Banisteria ovata* Cav. *Diss.* 429, t. 257, f. 1 (1790). *Stigmatophyllum ovatum* Niedenzu in *Ind. Lect. Lyc. Brunsb.*, *Stigmatophyllum*, pt. 2, 31 (1900); Urb. *Symb. Ant.* iv. 331. (Fig. 78.) Specimens of Rohr & Aublet from Guiana, and of Smeathman from Ins. Carib. named by A. Juss. are in Her. Mus. Brit.

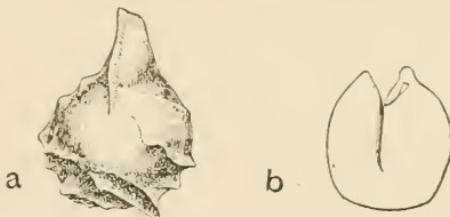


Fig. 78.—*Brachypterys ovata* Small.

a, A coccus, nat. size.
b, Embryo enlarged (after A. de Jussieu).

In salt marshes on the seaside, Macfadyen! near Annotto Bay; Port Maria; McNab! Wilson.—West Indies, northern S. America, Central America.

Shrub 1-4 ft. Leaves ovate to lanceolate, apex acute or somewhat obtuse, base rounded, glabrous above, pubescent with soft short hairs beneath, midrib prominent beneath and with 2 glands on it at the base, 5-11 cm. l.; petiole 1-1.5 cm. l.; bracts roundish-ovate or round, 1.3-1.5 cm. l. Umbels 3-4-flowered, pedicels 1.5-3 cm. l.; peduncle 3.5-6 cm. l. Sepals scarcely exceeding the glands by 1 mm.; glands oblong, 2.5-3 mm. l. Petals: limb crenulate, base wedge-shaped, 7-13 mm. in diam.; claw 2-4 mm. l. Styles 3, equal, the appendage hook-like. Coccii somewhat spherical, 10-13 mm. in diam., outer surface with irregular prominent markings; apical crest triangular, 3-5 mm. l. or more.

6. STIGMAPHYLLON A. Juss.

Trailing twining shrubs, climbing over shrubs and trees. Leaves often silky beneath with hairs attached by their middle, with 2 glands at apex of stalk or base of midrib; stipules minute. Flowers in peduncled umbel-like corymbs. Calyx with 8 glands. Petals yellow, 5-12 mm. in diam. Stamens unequal, 6 perfect, 4 not properly developed. Styles 3, truncate at apex or more or less angled, or produced beyond the stigma into a foot-like or expanded appendage. Samarae 1-3, with the wing thickened on the upper margin. Cotyledons often unequal, with the larger enfolding the smaller.

Species about 50, natives of tropical America, including the West Indies.

- Leaves apiculate, apex emarginate, or rounded. Apex of styles truncate or foot-like; anterior style shorter than the posterior..... 1. *S. emarginatum*.
 Leaves acuminate. Apex of styles with a horizontal expansion; anterior style longer than the posterior 2. *S. puberum*.

1. *S. emarginatum* A. Juss. in *Ann. Sc. Nat. sér. 2, xiii.* 290 (1840) & *Arch. Mus. Par. iii.* 382; leaves of various forms and sizes, but, in Jamaican species, usually broadly elliptical, ovate, or roundish, sometimes lanceolate, apex generally emarginate and apiculate, base cordate to emarginate, or rounded, or truncate, silky especially beneath, becoming more or less glabrate, usually

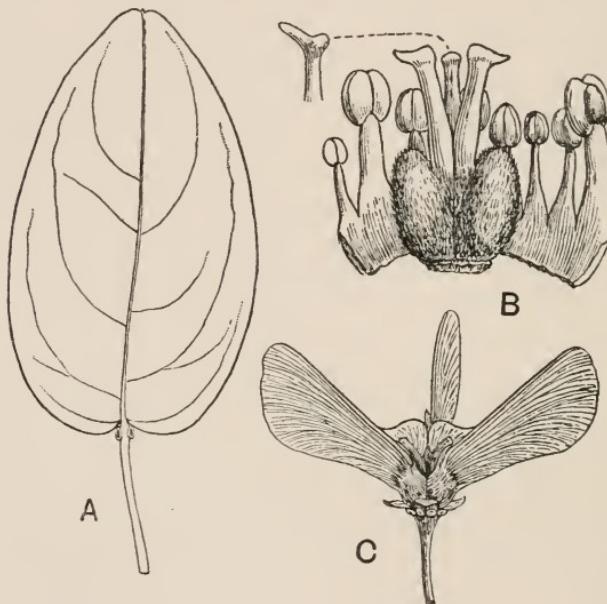


Fig. 79.—*Stigmaphyllon emarginatum* A. Juss.

A, Leaf, nat. size. B, Stamens and pistil $\times 4$.
 C, Fruit, nat. size.

membranous or papery in younger branches, often subleathery in older branches; anterior style (the one opposite the glandless sepal) curved, shorter and slenderer than the two posterior, its apex usually growing into an appendage above the stigma continuous with the style; apex of the posterior styles truncate and more or less angled or foot-like; Griseb. *Fl. Br. W. Ind.* 118; Niedenzu in *Ind. Lect. Lyc. Brunsb.*, *Stigmaphyllon*, pt. 1, 5; Small in *Fl. N. Amer.* xxv. 140. *S. periplocaefolium* A. Juss. in *Ann. Sc. Nat. sér. 2, xiii.* 290 (1840) & *Arch. Mus. Par. iii.* 380; Griseb. *op. cit.* 119; Niedenzu *tom. cit.* 7. *S. diversifolium* A. Juss. (in part) in *Ann. Sc. Nat. sér. 2, xiii.* 290 (1840) & *Arch.*

Mus. Par. iii. 381. *S. lingulatum* *Small loc. cit.* (1910). *Acer scandens minus, apocyni facie, folio subrotundo* *Sloane Cat.* 138 & *Hist. ii.* 27, *t.* 167, *f.* 2. *Banisteria foliis orbiculatis &c.* *Browne Hist. Jam.* 231. *Banisteria fulgens L. Sp. Pl.* 427 (1753) (non *S. fulgens A. Juss.* 1840). *B. emarginata Cav. Diss.* 425, *t.* 249 (1790). *Tripteris lingulatum Poir.* in *Lam. Encyc. viii.* 104 (1808). *B. periplocaefolia DC. Prodr.* *i.* 589 (1824). *B. splendens Macf. Jam.* *i.* 152 (1837) (non *DC.*). (Fig. 79.) Specimen from Hort. Cliff. in Herb. Mus. Brit., also one from Browne in Herb. Linn. named by Linnaeus *Banisteria fulgens*.

Sloane Herb. *v.* 94, 95, 96! *Houstoun!* *Browne!* *Wright!* *Shakspear!* *Macfadyen!* *Distin!* St. Mary, *McNab!* *Purdie!* *Wilson!* *Prior!* *March!* *Hope Grounds, J.P.* 1009; King's House grounds, *J.P.* 1809; *Morris!* Lucea, *Hitchcock;* Gordon Town, 1100 ft.; sea-coast near Falmouth; Papine 800 ft.; Spanish Town road, 100 ft.; Fort Henderson; Green Island, Fish river; Montego Bay; near Old Harbour Bay; *Harris!* Fl. Jam. 5706, 7236, 8368, 8524, 9232, 10,148, 10,258, 10,350, 11,947.—West Indies from Cuba to St. Lucia.

Leaves 1-14 cm. l., .5-9 cm. br. Peduncles and pedicels pubescent with adpressed hairs or glabrescent. Sepals ovate or roundish ovate, exceeding the glands by 2-3 mm.; glands elliptical or roundish ovate, 1.5-2 mm. l. Petals 8-12 mm. in diam.; claw 2-4 mm. l. Samara: pericarp ribbed lengthwise and somewhat reticulately, 4-6 mm. l.; wing obliquely obovate-oblong, 16-20 mm. l., 6-9 mm. br.; appendage at base of wing triangular, rounded, or somewhat 4-sided, 2-3 mm. l.

Intermediate forms between *S. emarginatum* and *S. periplocaefolium* occur in Jamaica, as Niedenzu has pointed out; we think that these forms, and those occurring in the other islands, which have been known as *S. periplocaefolium*, should all be regarded as one species.

The Hort. Cliff. specimen, and one collected by Distin in Jamaica in Herb. Kew., are considered by A. Jussieu to belong to his species *S. diversifolium*, but we do not think that these specimens can be separated from *S. emarginatum*.

We have seen in Herb. Smith at the Linnean Society the leaf which Cavanilles sent for comparison with the specimen named *Banisteria fulgens* by Linnaeus (see *Cav. Diss.* 427), and as Smith pointed out it is different. It is unfortunate that Smith's answer was delayed so long that Cavanilles' plate was engraved with the name *B. fulgens*, and Cavanilles felt himself compelled to put the name which Lamarck had given in error into circulation. Jussieu followed Cavanilles, and in transferring the species to *Stigmaphyllum*, called it *S. fulgens*. As this name has been so long in use, another *S. fulgens* cannot now displace it.

2. *S. puberum A. Juss.* in *Ann. Sc. Nat. sér. 2, xiii.* 289 (1840) & *Arch. Mus. Par. iii.* 376; leaves ovate-elliptical, usually long acuminate, base subcordate or rounded or obtuse, membranous, glabrous above, silky pubescent beneath; anterior style longer than the posterior, apex growing out into an expansion separated from the stigma by a short stalk, irregularly 4-sided; apex of the posterior styles growing into a falcate-acute expansion; *Griseb. loc. cit.*; Niedenzu *op. cit. pt. 2,* 22; *Urb. Symb. Ant.* *iv.* 331; *Small tom. cit.* 144. *Banisteria pubera L. C. Rich.* in *Act. Soc. Hist. Nat. Par.* *i.* 109 (1792).

"St. Mary"; "near Annatto Bay, St. George"; McNab!—West Indies, Panama and northern South America.

Leaves 7–15 cm. l., 3·5–10 cm. br., floral leaves on an axillary branch, often lanceolate or bract-like, petioles silky with adpressed hairs 4–1·5 cm. l. Sepals ovate or somewhat obovate-oblong, exceeding the glands by 1·5–2 mm.; glands elliptical 1–1·5 mm. l. Petals with fringed margin; limb 5–8 mm. in diam.; claw 2–3 mm. l. Samara oblong to oblong-lanceolate; wing to 3·5 cm. l., at the base to 1·5 cm. br.

7. TRIOPTERIS L.

Climbing shrubs. Leaves without stipules. Racemes or panicles axillary and terminal. Glands of the calyx 8. Petals pink or purplish. Stamens all perfect. Ovary 3-lobed, lobes 3-crested, and with a small lobe below the median crest. Samarae 3, crested on the back, 3-winged; the lateral wings erect, united with the third inferior into a deeply 3-lobed, Y-shaped wing. Embryo folded on itself.

Species 3 or 4, natives of the West Indies and the Bahamas.

Leaves oblong-ovate or ovate, obtuse or acute.

Inflorescence corymb-like 1. *T. paniculata*.

Leaves broadly ovate, markedly acuminate.

Inflorescence pyramidal 2. *T. Brittonii*.

1. *T. paniculata* Small in N. Amer. Fl. xxv. 124 (1910); leaves ovate, ovate-lanceolate, lanceolate, or rarely elliptical, apex obtuse or acute, base rounded or subcordate; panicle somewhat corymb-like.—*T. jamaicensis* Sw. Obs. Bot. 183 (1791); Macf. Jam. i. 150 (non L.); A. Juss. in Arch. Mus. Par. iii. 516 under *T. ovata* Cav.; Griseb. Fl. Br. W. Ind. 120. Banisteria seminibus trialatis &c. Browne Hist. Jam. 231. Malpighia paniculata Mill. Gard. Dict. ed. 8 (1768). (Fig. 80.) The type, Miller's specimen, is in Herb. Mus. Brit. A specimen from

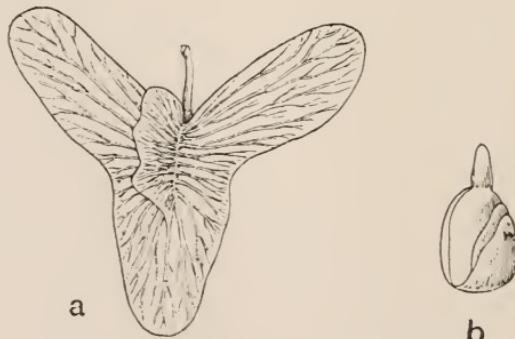


Fig. 80.—*Triopteris paniculata* Small.

a, Samara $\times 2$.

b, Embryo enlarged (after A. de Jussieu).

Browne is in Herb. Linn. named *Banisteria benghalensis* by Linnaeus.

Sloane Herb. v. 92! *Houstoun*! *Browne*! *Wright*! *Broughton*! *Shakspear*! *Swartz*; *Macfadyen*! *Wilson*! *March*! Watson's Hill, Manchester, 800 ft.; near Letitz, 500 ft.; Pedro Bluff; *Harris*! Fl. Jam. 6380, 7263, 9939.

Leaves reticulate-veined, 3-10 cm. l., 1·7-3·7 cm. br. Sepals 3-3·5 mm. l. Petals pink or light purplish, to 5 or 6 mm. l.; blades broadly roundish or kidney-shaped, with undulate margin. Samarae 14-24 mm. l.; upper wings oblong, the lower one oblong, or oblong-lanceolate, or narrowly elliptical; crest subrhomboid with sinuate-eroded margin.

T. ovata Cav. from Hispaniola, with which the Jamaican species has been confused, differs in having smaller flowers, and the crest of the samara being ovate-triangular. *T. jamaicensis* L. is the species from Cuba and the Bahamas, with oblong-elliptical leaves, 2-3 cm. l.; it has not been found in Jamaica.

2. *T. Brittonii* *Small* in *N. Amer. Fl.* xxv. 124 (1910); leaves ovate, usually broadly so, markedly acuminate, base cordate; panicle pyramidal.

Spur Tree Hill, *Britton*, 1069. Type in Herb. N. York Bot. Gard. of which a small portion has been presented to Herb. Mus. Brit. by Dr. N. L. Britton!

Leaves reticulate-veined, 4-10 cm. l. Sepals ovate, about 2 mm. l.; glands about 1·5 mm. l. Petals purplish, to 4·5 or 5 mm. l.; blades roundish, undulate and sometimes irregularly toothed. Samarae not known.

8. TETRAPTERIS Cav.

Woody climbers, trailing over rocks and trees. Leaves without glands; stipules inconspicuous. Umbels or racemes generally paniculate, terminal. Calyx usually 8-glandular. Petals yellow. Filaments united below. Ovary 3-lobed, lobes crested on the back and with 2 appendages on each side. Apex of styles slightly enlarged. Samarae 1-3, crested on the back, with 4 lateral wings placed X-like, 2 above and 2 below. Embryo folded on itself.

Species over 60, natives of tropical continental America (chiefly Brazil), and the West Indies.

T. citrifolia Pers. *Syn. i.* 508 (1805) (excl. syn.) ; *Macf. Jam. i.* 151 (excl. syn. Cav.) ; *Urb. Symb. Ant. iv.* 328 (in part); *Small in N. Amer. Fl.* xxv. 125; *A. Juss. in Arch. Mus. Par. iii.* 522 & *Griseb. Fl. Br. W. Ind.* 121 under *T. inæqualis* Cav. *Banisteria foliis ovatis obpositis &c. Plum. Pl. Amer. (Burm.) 9, t. 16. Triapteris citrifolia Sw. Prodr. 75 (1788) & Fl. Ind. Occ. 857. T. bifurca Gaertn. Fruct. ii. 168, t. 116 (1791). (Fig. 81.) There is a specimen from Swartz in Herb. Mus. Brit.*

Mountain woods, *Swartz*! between Halberstadt and Galloway House, *Macfadyen*; St. Mary, *McNab*! *Purdie*! *Wilson*!—Hispaniola.

Leaves elliptical or oblong-elliptical, apex acute, blunt, or shortly acuminate, glabrous, base rounded, obtuse or wedge-shaped, 5-13(-17) cm. l.; glands wanting. Inflorescence: branches and pedicels white at first with short adpressed hairs, then glabrate; bracts at base of main branches, leaf-like. Sepals broadly ovate to oblong-ovate, exceeding the glands by 1-1.5 mm.; glands oblong, 2-2.5 mm. l. Petals elliptical to roundish, 4-6 mm. l., margin undulate, base hastate; claws about 3 mm. l.

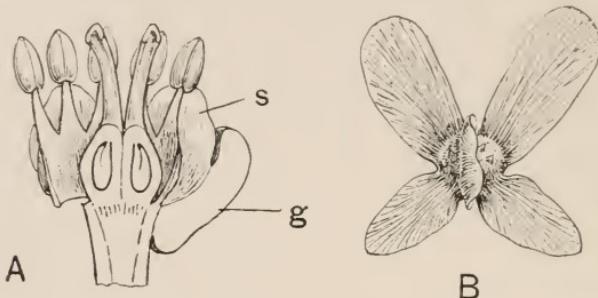


Fig. 81.—*Tetrapteris citrifolia* Pers.

A, Flower cut lengthwise, corolla removed; s, sepal; g, gland $\times 6$.
B, Samara, nat. size.

Filaments lanceolate or awl-shaped. Samarae: upper wings oblong or obovate-oblong, puberulous at the base, 13-16 mm. l.; lower wings slightly puberulous, 9-10 mm. l.; body somewhat densely puberulous, with a wing-like crest on the back.

T. inæqualis Cav. which is found in Hispaniola, Porto Rico, Martinique, and St. Vincent, differs from this species in some characters, especially in the dorsal crest being a mere ridge.

9. MASCAGNIA Bert.

Shrubs, trailing and climbing (in the Jamaican species). Stipules minute, at the base of the petiole, deciduous; glands near the top of the petiole. Inflorescence axillary and terminal racemes, often paniculate; pedicels jointed about the middle. Calyx: sepals 5, broad, persistent; glands 10 or 8. Petals 5, entire or fringed. Stamens 10, all perfect. Ovary 3-lobed, lobes obscurely 3-crested on the back; styles 3, distinct, unequal, apex foot-like. Samarae 1-3, each with a membranous crest on the back and winged at each margin; wings obversely deltoid or semicircular. Cotyledons leafy, nearly equal.

Species 40, natives of tropical America (incl. West Indies).

M. Hiræa comb. nov.—M. jamaicensis Urb. & Niedenzu in *Arb. Inst. Braunsb.*, *Mascagnia* 24 (1908); *Small in N. Amer. Fl.* xxv. 119. M. Simsiana Griseb. *Fl. Br. W. Ind.* 121 (as regards the Jamaican plant) (non *Hiræa Simsiana* Juss.). *Triopteris Hiræa* Gærtn. *Fruct. ii.* 169, t. 116 (1791). (Fig. 82.) Type in *Herb. Mus. Brit.*

Wright! *Distin!* *Cuming!* Great Valley, Manchester, *Purdie!* Glasgow near Troy, 1400 ft.; Pepper, St. Elizabeth, 250 ft.; Spur Tree Hill, 2000 ft.; *Harris!* Fl. Jam. 9487, 9862, 9865.

Stems to 20 ft. l. Leaves ovate, 6-13 cm. l. Sepals ovate, oblong, or roundish, 3-4 mm. l.; glands 1-2 mm. l. Petals yellow, spreading: limb

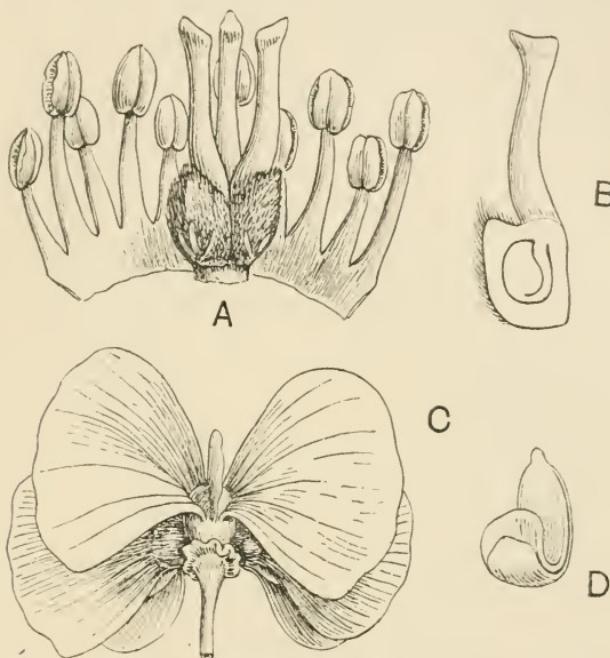


Fig. 82.—*Mascagnia Hiraea* Fawc. & Rendle.

A, Stamens and pistil $\times 4$.

B, Carpel with ovary cut lengthwise $\times 6$.

C, Fruit $\times 1\frac{1}{2}$.

D, Embryo (after A. de Jussieu)

roundish, 4 similar with entire margin and base retuse or somewhat toothed, the fifth with a fringe (1-2 mm. l.) all round, 7-11 mm. l.; claw 3 mm. l. Stamens unequal. Samarae glabrate: crest about 8 mm. deep, 2-3 mm. br.; wings obversely deltoid, to 2 cm. deep and br., outer margin irregular.

FAMILY L. POLYGALACEÆ.

Herbs, or shrubs often climbing, or trees. Leaves generally alternate, simple, without stipules. Flowers in spikes or racemes, hermaphrodite, irregular. Sepals 5, imbricate, the 2 innermost larger, petaloid, wing-like ("wings"), all persistent round the fruit (in *Polygala*). Petals 3 or 5, the large petal concave, enclosing the stamens and pistil ("keel"), 2 nearly as long as the keel, 2 (in W. Indian species) wanting or very small and scale-like. Stamens 8; filaments united into a cleft sheath and adhering more or less to the petals at the base; anthers some-

what broadly tubular, 2-celled, each cell with an oblique opening at the apex. Ovary 2-celled (1 cell sometimes abortive). Ovules solitary, pendulous, anatropous, with a ventral raphe. Fruit a 2-celled loculicidal capsule, or a dry 1-celled winged fruit, not opening. Seeds with, or without endosperm. Embryo straight.

Species 800, dispersed through the temperate and warmer regions of the whole world.

- Ovary 2-celled. Fruit a capsule..... 1. *Polygala*.
 Ovary 1-celled. Fruit samaroid..... 2. *Securidaca*.

1. POLYGALA L.

Herbs, shrubs, or trees. Petals 2, more or less adhering to the staminal tube and the keel. Anthers 1- or 2-celled opening by a transverse foramen or inwards by an oblique one. Ovary 2-celled. Capsule opening loculicidally at the margin.

Species 600 or more, natives of temperate and warmer regions of the whole world.

Flower with crested keel. Herb..... 1. *P. paniculata*.
 Keel without crest.

Herb. Racemes lax..... 2. *P. angustifolia*.
 Shrub or tree. Racemes dense, pedicels umbellate 3. *P. jamaicensis*.

1. *P. paniculata* L. *Syst. ed.* 10, 1154 (1759) & *Amœn. v.* 381, 402; slender annual herb, 5-12 inches (1·3-3 dm.), and more, high; stem and leaves densely covered with minute glands, sometimes glandular-puberulous; racemes terminal and lateral, loosely-flowered; keel crested.—*Sw. Obs. Bot.* 272, t. 6, f. 2; *H. B. & K. Nov. Gen. & Sp. v.* 402; *Bot. Reg. t.* 761; *Macf. Jam. i.* 47; *Griseb. Fl. Br. W. Ind.* 28; *A. W. Bennett in Fl. Bras. xiii. pt. 3, 31, t. 11, f. 2*; *Chod. in Mém. Soc. Phys. Genève xxxi. n. 2, 229, t. 24, f. 10, 11*; *Urb. Symb. Ant. iv.* 336; *Blake in Contrib. Gray Herb. n.s., no. xlvi. 99, t. 2, f. 77*. *P. herbacea minor* &c. *Browne Hist. Jam.* 287. (Fig. 83.) The type, a specimen from Browne, is in Herb. Linn.

Browne! *Masson!* *Macfadyen!* Port Royal Mts., *McNab!* also *Purdie!* Newcastle, 4000 ft., *Eggers!* Resource, J.P. 1140, *Morris!* Cinchona, 4900 ft., *Fawcett!* also *Clute!* Williams Ford, *Millspaugh*; Bog Walk; Port Antonio; *Hitchcock*; Scott's Hall; Prospect Hill, 2000 ft.; *Thompson!* near Castleton, 500 ft.; Troy, 1800 ft.; *Harris!* Fl. Jam. 7403, 7911, 7938, 9400.—West Indies, tropical continental America.

Leaves alternate (but opposite or whorled near the base), 7-18 mm. l., linear, attenuate-acuminate at both ends. Racemes 3-9 cm. l. Flowers very small, 2-2·5 mm. l., rosy or purplish, rarely white. Sepals sub-petaloid, free, persistent, with 2 whitish linear glands on each; upper roundish-elliptical, apex obtuse, 1·1-1·3 mm. l., two lower oblong or narrowly elliptical, 1·1-1·2 mm. l. Wings petaloid, persistent, 1-3-nerved, elliptical, narrowed to base, twice as long as sepals, 2·2-2·5 mm. l. Petals lanceolate, apex obtuse, 2-2·5 mm. l. Keel 2·2 mm. l., with crest of

4 pairs of narrow lobes. Ovary glabrous; style somewhat longer than ovary; stigmas crested, one at apex of style, the other halfway between apex and ovary. Capsule elliptical, apex emarginate, cells somewhat unequal, both opening, 2·5–3 mm. l., about 1·5 mm. br. Seed 1·6 mm. l., black, minutely puberulous with white hairs. Aril consisting of a minute

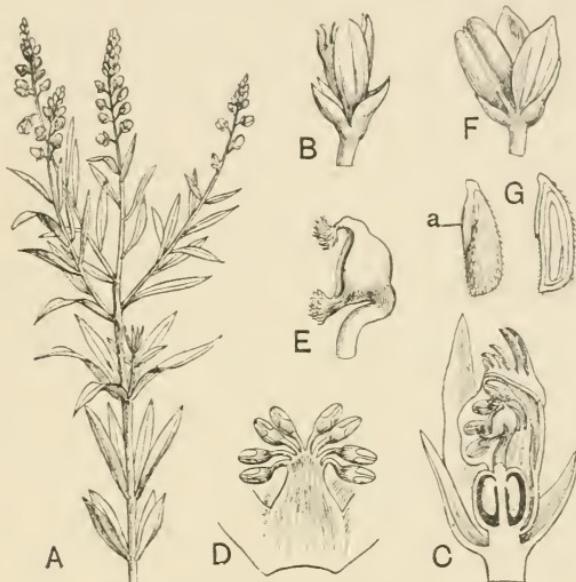


Fig. 83.—*Polygala paniculata* L.

A, Branch with leaves and inflorescence $\times \frac{2}{3}$.

B, Flower $\times 5$.

C, Flower cut lengthwise $\times 10$.

D, Staminal tube enlarged.

E, Apex of style, showing stigmas enlarged.

F, Capsule with the persistent calyx and

wings $\times 4$.

G, Seed entire and cut lengthwise $\times 10$;

a, aril.

(After A. W. Bennett in *Fl. Bras.*)

horny mucro at the apex of the seed to which are attached 2 adpressed narrowly oblong or linear-ob lanceolate, scarious lobes, ·8 mm. l.

"An interesting and beautiful inhabitant of our mountain pastures. Its properties are said to be sudorific and diuretic, and it may be administered in decoction or infusion" (Macfadyen). In Brazil the plant is used as a "medicinal tea."

2. *P. angustifolia* H. B. & K. Nov. Gen. & Sp. v. 405, t. 511 (1823); annual herb, 4–12 inches (1–3 dm.) and more, high; stem and branches puberulous, not glandular; racemes above the axils, loosely-flowered; keel without crest.—*Griseb. loc. cit.*; *Chod. tom. cit. 52*, t. 15, f. 22–24; *Blake tom. cit. 67*, t. 2, f. 45 (non A. W. Bennett). *P. bryzoides St. Hil. Fl. Bras. Mer. ii. 44*, t. 88 (1829); *A. W. Benn. in Fl. Bras. tom. cit. 13*. *P. mucronata Macf. Jam. i. 47* (1837) (non Willd.). *P. camporum Benth. in Hook. Journ. Bot. iv. 100* (1842). *P. americana Mill. var. angustifolia Kuntze Rev. Gen. Pl. i. 48* (1891).

Little Hope pastures, St. Andrew, *Macfadyen*! St. Andrew, *McNab*! King's House grounds; Hope grounds; *Harris*! Fl. Jam. 6904, 8153.—Cuba, St. Thomas, Grenada, Tobago, Trinidad, Mexico, Guatemala, Guiana, Brazil, Paraguay.

Leaves lanceolate to linear, 2-5 cm. l. Racemes 2-10 cm. l., with 10-30 flowers. Flowers pale yellow with a tinge of purple, about 4 mm. l. Sepals persistent, the two lower united nearly to apex, oblong or oblong-elliptical, with a few stalked glands near the apex, 1·3-2 mm. l. Wings petaloid, persistent, obovate-elliptical, somewhat unequal-sided, wedge-shaped at base, with a white spot near the apex, 3-4 mm. l., pinkish-purple. Petals mauve-purplish, about 3·8 mm. l., wedge-shaped at base, middle part contracted, upper part (1 mm. l.) roundish. Keel obtuse, about 4 mm. l., attached to the staminal tube at the base. Stamens about 4 mm. l.; filaments united for more than half their length. Style about 3·5 mm. l., bent at right angles just above the middle, puberulous just below the shortly 2-lobed stigma. Capsule oblong-elliptical, emarginate, slightly swollen, 3-3·5 mm. l., cells equal. Seed about 2·5 mm. l., white, cylindrical, minutely silky-puberulous. Aril helmet-like at apex of seed, minutely 3-lobed at the base, about 7 mm. l.

3. *P. jamaicensis* Chod. in Mém. Soc. Phys. Genève xxxi. n. 2, 11, t. 13, f. 14 (1893); shrub or tree, 8-18 ft. high; racemes very short, dense, corymbose-umbelliform; keel without crest.—*Blake* tom. cit. 14, t. 1, f. 3. *P. fruticosa* . . . floribus confertis &c. *Browne Hist. Jam.* 287. *P. fruticosa* . . . capsulis subrotundis &c. *Browne loc. cit.* t. 5, f. 3. *P. arborea* &c. *Browne loc. cit.* *P. diversifolia* L. *Amœn. v.* 381 & *Sp. Pl. ed.* 2, 989 (in part); *Sw. Obs. Bot.* 273. *P. chinensis* L. *loc. cit.* (in part). *Genistæ affinis Anonyma* &c. *Sloane Cat.* 141 & *Hist. ii.* 32, t. 170, f. 2. *Badiera diversifolia* DC. *Prodr. i.* 334 (1824); *Britton in Bull. Torr. Bot. Cl.* xxxii. 362.

White Lignum Vitæ.

Sloane Hb. v. 100! *Browne*! *Wright*! *Swartz*! *Macfadyen*! rocks, sea-coast, Manchester, *Purdie*! White river, *Prior*! *March*! *Wilson*! Rock Fort, near Kingston; Bath; J.P. 641, *Hart*! near Old England, Blue Mts., 3000-3500 ft.; near Ewarton, 950 it.; Bridge Hill, 1500 ft.; Malvern, 2200 ft.; *Harris*! Fl. Jam. 5888, 6597, 6671, 7092, 9651.

Leaves ovate to lanceolate, 3·5-8 cm. l. Racemes axillary; peduncle 1-1·5 mm. l.; pedicels 2-4 mm. l. Sepals elliptical or roundish, 1-1·3 mm. l., free, deciduous or more or less persistent. Wings obliquely ovate, 1·5-2 mm. l. Petals 3·8-4·3 mm. l., lower half ovate-oblong, next quarter inflexed-contracted, uppermost quarter somewhat deltoid. Keel 3·9-4·5 mm. l., blunt, contracted obliquely at the base into a claw; claw attached to the staminal tube. Stamens about 3·5 mm. l.; filaments glabrous, united nearly to apex. Ovary puberulous; style about 2·5 mm. l., stigmatic lobes close together, not tufted. Capsule leathery-fleshy, somewhat roundish, cells equal, at length opening (one cell sometimes not developed), keeled above, not winged, shortly stalked, 6·5-10 mm. l., 7-11 mm. br.

P. diversifolia L. Sp. Pl. 703, from description in Hort. Cliff. (p. 353) and specimen (from Hort. Cliff.) in Herb. Mus. Brit. is *Securidaca scandens* Jacq. In Amœn. v. 381, Linnaeus identified Browne's no. 2 as *P. diversifolia*, and a specimen from Browne is so named in Herb. Linn.; Browne's no. 4 Linnaeus named *P. chinensis*, and a specimen from Browne is pinned to the type of *P. chinensis*. Both Browne's specimens

are *P. jamaicensis* Chod. In Sp. Pl. ed. 2, 988 Linnaeus includes under *P. diversifolia* (i.e. *Securidaca scandens*) a reference to Browne's no. 3 (i.e. *P. jamaicensis*).

2. SECURIDACA L.

Shrubs generally climbing. Leaves alternate, entire, generally with stipular glands. Racemes terminal and axillary, often paniculate. Sepals and wings deciduous. Petals 4, 2 larger, adhering at the base to the staminal tube but distant from the

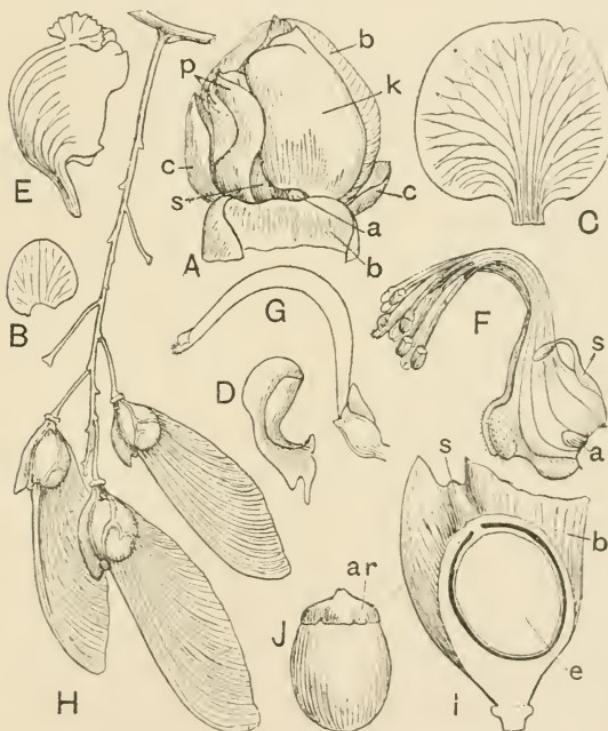


Fig. 84.—*Securidaca*.

- A, Bud of *S. Brownei* Griseb. with a wing cut away $\times 5$; c, calyx; b, wings; p, petals; a, rudimentary petal; k, keel; s, staminal sheath.
 B, Sepal of *S. erecta* L. $\times 4$.
 C, Wing of ditto $\times 4$.
 D, Petal of ditto $\times 4$.
 E, Keel of ditto $\times 4$.
 F, Staminal sheath of ditto $\times 6$; s, abortive stamen; a, rudimentary petal.
 G, Pistil of ditto $\times 6$.
 H, Fruit of *S. Brownei* Griseb. $\times 2$.
 I, Base of fruit of ditto cut lengthwise $\times 3$; b, wing cut off; s, point where style has been; e, embryo.
 J, Seed of ditto $\times 3$; ar, aril.

keel, 2 rudimentary, scale-like. Keel, middle portion of apex expanded, sometimes crest-like. Ovary 1-celled through the abortion of the second cell, with an appendage on one side, developing into the wing of the fruit, style curved hook-like.

sub-2-lobed at the stigmatic apex. Fruit with a long terminal wing, not opening. Seed with a short cap-like adpressed aril; endosperm wanting; embryo undivided.

Species about 30, mostly natives of tropical and sub-tropical America, including West Indies, a few in Africa and Asia.

Racemes forming a corymbose leafy panicle. Anterior margin of seed-case wider above, rounded or horn-like 1. *S. Brownei*.

Racemes lax. Anterior margin of seed-case narrow, of same breadth throughout..... 2. *S. erecta*.

Panicles long; branches distant. Anterior margin of seed-case narrow below, broad above; apex 2-toothed 3. *S. Lamarckii*.

1. *S. Brownei* Griseb. *Fl. Br. W. Ind.* 30 (1859); racemes dense, with numerous flowers, forming a somewhat corymbose leafy panicle; anterior margin of seed-case wider above, rounded or produced into an obtuse horn-like projection.—*S. virgata* Macf. *Jam. i.* 49 (1837) (non *Sw.*). *S. scandens* foliis oblongis &c. *Browne Hist. Jam.* 288. *Ehret's Original Sketches of Browne's Jamaican Plants*, 61, 62. (Fig. 84, A, H-J.)

Red Hills, *Browne*; *Wright!* *Broughton!* *Shakspear!* common on limestone, *Macfadyen!* between Claremont and Bellfield, St. Mary, *McNab!* Browns Town; near Penn Hill; *Purdie!* *Wilson!* *Prior!* *March!* below Vinegar Hill; Hall's Delight; St. George, 2000 ft.; Olive R., near Christiana, 3000 ft.; Holly Mount, Mt. Diablo, 2500-3000 ft; Mount Pleasant, Stony Hill, 1100 ft.; Kempshot, 1100-1600 ft.; Red Hills, St. Andrew, 1000 ft.; *Harris!* Brandon Hill, 1000 ft., *Thompson!* Plowden Hill, *Fawcett!* Bower's Wood road, *Britton*, 2615! Fl. Jam. 5545, 7674, 8039, 8240, 8992, 8999, 10,326, 11,140, 11,838.

Shrub with numerous branches trailing over neighbouring shrubs and low trees to a height of 25-40 ft. Leaves elliptical, rounded at apex, obtuse or wedge-shaped at base, minutely puberulous or glabrous, 5-4 cm. l., becoming gradually smaller (to 1 cm. l.) near the flowers. Racemes 4-8 cm. l. Sepals 4-3 mm. l., elliptical to roundish, coloured, densely puberulous on the outside, minutely ciliate, with parallel dark veins. Wings large, semicircular or rounded, unequal-sided, minutely ciliate, 1.7-1 cm. br. and nearly as long, with a very short claw. Petals oblong, contracted in the middle, oblique and rounded above, gibbous at base, about 6 mm. l.; lateral scale-like, oblong, about 1 mm. l. Keel: blade about 8 mm. l., as folded together 3 mm. br., narrowly elliptical along the edge of the fold, somewhat straight along the free margin, truncate at base; central portion of apex folded together with an irregular margin. Staminal sheath villous along the margin, about as long as the petals; free filaments about 2 mm. l. Ovary compressed-ellipsoidal, margined on both sides, margin on one side passing into the style just below the apex, on the other slightly enlarged and forming a very short appendage above the ovary; style excentric, bent like a hook; stigma with 2 capitate lobes. Fruit: seed-case about 1 cm. l., and as broad or nearly so, marked with a few branching lines, sometimes not prominent; wing somewhat oblong, 3-4 cm. l., 2-1.5 cm. br. near apex, 9-10 mm. br. at base.

2. *S. erecta* Jacq. *Enum. Pl. Carib.* 27 (1760); racemes lax, anterior margin of seed-case very narrow, of the same breadth

throughout, without any projection.—*Jacq. Sel. Stirp. Amer.* 197, t. 183, f. 39 & *Ed. pict.* t. 261, f. 56; *L. Sp. Pl. ed.* 2, 992. *S. volubilis* *L. Syst. ed.* 10, 1155 (1759) (non *Sp. Pl.* 707). *S. virgata* *Sw. Prodr.* 104 (1788) & *Fl. Ind. Oce.* 1231; *Griseb. Fl. Br. W. Ind.* 30; *Urb. Symb. Ant.* iv. 337 (non *Macf.*). *S. scandens* *Tuss. Fl. Ant.* iv. 57, t. 20 (1827) (non *L.*). *S. foliis orbiculatis* &c. *Plum. Pl. Amer.* (*Burm.*) 245, t. 248, f. 1. *S. fruticosa* *foliis subrotundis* &c. *Browne Hist. Jam.* 287. A specimen from Swartz from Hispaniola in *Herb. Mus. Brit.* (Fig. 84, B-G.)

St. James, *Browne*; mountains, St. James, *Tussac*; *Macfadyen!*—Cuba, Hispaniola, Porto Rico.

Shrub with numerous slender flexible branches, supporting themselves on neighbouring shrubs and low trees and often reaching to their summits. *Leaves* elliptical or round, sometimes ovate-roundish, generally more or less emarginate, 2-1·5 cm. l. on the lower branches, becoming smaller to ·5 cm. l. on the flowering branches. *Racemes* numerous at ends of branches, to 1·5 dm. l. *Flowers* smelling of violets. *Sepals* ovate to roundish-ovate, 2-3 mm. l., puberulous on the outside and margin, somewhat veiny. *Wings* unequal-sided, roundish or somewhat triangular, 8 mm. l. and br., minutely ciliate; claw about 1·3 mm. l. *Petals* obovate above, oblong below, much curved and concave, about 5 mm. l.; upper portion 2·5 mm. br.; base with a sinus, so that there appears to be 2 claws; lateral lanceolate, about ·6 mm. l. *Keel*: blade about 6 mm. l. (as folded together), 4 mm. br., edge of the fold curved outwards elliptically, free margin slightly concave, truncate at the base; middle portion of the apex forming a large, expanded, irregularly toothed crest, about 2 mm. l.; claw 2 mm. l. *Staminal sheath* about 6 mm. l.; free filaments 3-4 mm. l.; with a small abortive stamen at the back. *Ovary* compressed-ellipsoidal, about 1 mm. l., very shortly stalked, margined on one side; appendage on the other side triangular-conical, free part above ovary generally ·8 mm. l. *Fruit*: seed-case 7-9 mm. l., 4·5-6 mm. br., reticulate with prominent lines; wing narrowly elliptical, or with an elliptic curve on anterior side and somewhat straight on posterior side, 2·5-3 cm. l., 10-12 mm. br. above, gradually narrowing to 4-6 mm. br. at base, extending down $\frac{1}{3}$ - $\frac{1}{2}$ the posterior side of seed-case; seed-case and base of wing minutely puberulous, rest of wing glabrescent.

Jacquin founded his species on Browne's description on p. 287 of the "Natural History of Jamaica." The specimen of *S. volubilis* L. Sp. Pl. 707 in the Linnean herbarium is *Nissolia fruticosa* Jacq., and the citation from Plumier, *Sparteum . . . citri foliis, floribus albis* &c., confirms our view that Linnaeus was not dealing with any species of the genus *Securidaca* as understood by Jacquin and other botanists. The *S. volubilis* of the *Systema ed.* 10, refers to Browne's description, but in the second edition of "Species Plantarum" (992) the name is given up, and Jacquin's name substituted.

3. S. Lamarckii *Griseb. Fl. Br. W. Ind.* 30 (1859); inflorescence paniculate, often very long with distant branches, lax-flowered; anterior margin of seed-case narrow below, broad above, apex 2-toothed, about 4 mm. above seed-case.—*S. scandens Lam. Encyc. rii.* 51 (1806) (excl. syn.) (non *L.*) & *Illustr. t.* 599, f. 1.

Macfadyen (fide Grisebach).—St. Cruz (introduced), Martinique, St. Vincent.

Shrub with numerous flexible branches, bending at the tip, forming large open hooks for support. *Leaves* elliptical, apex obtuse or sub-emarginate, base obtuse or rounded, 3·5–7 cm. l., generally much smaller, about 1·5 cm. l. on the inflorescence; veins densely reticulated and prominent on both sides, upper surface glabrous or minutely puberulous at base, beneath minutely tomentose or puberulous. *Inflorescence* to 5 dm. l. and more. *Sepals* puberulous on the outside towards the base, ciliolate, two elliptical, narrowed on the lower half of one side, about 3 mm. l.; the third elliptical, concave, 4 mm. l. *Wings* about 9 mm. l., about 6 mm. br., unequal-sided, broadly elliptical, one side somewhat straight, wedge-shaped at the base forming a claw 3 mm. l. *Petals* broadly obovate above, oblong below, much curved and concave, about 7·5 mm. l., upper portion 2·5–3 mm. br.; lateral linear-lanceolate, 1 mm. l. *Keel*: blade ciliolate, 7–8 mm. l. (as folded together), 4–5 mm. br., somewhat ovate; apex forming an ample folded minutely toothed crest, about 1 mm. l.; claw ·5 mm. l. *Staminal sheath* about 7 mm. l.; free filaments about 2 mm. l. *Ovary* about 1·2 mm. l., shortly stalked, margined on one side, appendage on the other side ovate, acute, produced beyond the ovary about ·8 mm. l.; style about 1 cm. l. *Fruit*: seed-case 6 mm. l., 5–6 mm. br. (incl. margin), reticulate with prominent lines in the upper part, with a prominent nerve from the base; wing oblong-elliptical, about 4 cm. l., about 1·4 cm. br., with apex rounded from the anterior margin, narrowing on the posterior margin to form a stalk-like part 5–7 mm. l., 2–3 mm. br., not extending down the posterior side of seed-case.

This species is included on the authority of Grisebach, but we have not seen a specimen from Jamaica. Dr. O. Paulsen informs us that "it was introduced into St. Cruz in the 18th century and is now quite naturalized." Grisebach includes Cuba in the distribution, but the Cuban plant represents, we think, a different species.

FAMILY LI. EUPHORBIACEÆ.

Trees or shrubs or sometimes herbs, with sap often milky, occasionally poisonous. Leaves usually alternate, sometimes opposite or whorled, entire or toothed, sometimes digitately lobed, or with 3 or more digitate leaflets, or reduced to scales. Stipules often present, small, soon falling or persistent, rarely large, and sometimes enclosing the bud. Flowers unisexual, monœcious or diœcious, regular or slightly irregular. Perianth often small, sometimes wanting, sometimes dissimilar in the male and female flowers, either a calyx only, or calyx and corolla. Male flowers: Receptacle sometimes expanded into a disk within the stamens, or the glands or lobes of the disk alternating with the stamens of the outer series. Stamens sometimes indefinite in number, sometimes as many as the sepals or petals or fewer, or reduced to one. Filaments free or more or less united. Rudiment of ovary present or absent. Female flowers: Disk hypogynous, ring-like, lobed or cup-shaped, or represented by distinct glands, or wanting. Ovary usually 3-celled; styles as many as cells of ovary. Ovules 1 or 2 collateral in each cell, descending, anatropous, attached at the central angle of the cells; raphé ventral; funicle expanded

very often into a cushion-like outgrowth (obturator). Fruit usually capsular, splitting into as many cocci as there are ovary-cells, the axis persisting, each coccus opening above and along the back by 2 valves—sometimes drupaceous, divided into cells, not splitting. Seeds generally as many as the ovules, often with a caruncle at the apex. Endosperm usually copious, fleshy, rarely scanty or wanting. Embryo central, straight or slightly curved, generally as long as the endosperm; cotyledons flat, broad; radicle superior; rarely when the endosperm is scanty or wanting, the cotyledons are fleshy, large, and folded.

Species about 4,000, widely distributed over the world, mainly in the tropics.

Tribe I. *Phyllantheæ*. Perianth single, the calyx (rudimentary petals in *Savia*). Stamens opposite the sepals, or (in *Phyllanthus*) in centre of flower. Ovules 2 in each cell. Inflorescence axillary. (See also *Tetrorchidium* in Tribe *Crotoneæ*.)

Flowers without petals.

Ovary with 3 (or more) cells.

Stamens in centre of flower 1. *Phyllanthus*.

Stamens opposite sepals 2. *Securinega*.

Ovary with 2 cells (or 1).

Flowers in clusters 3. *Drypetes*.

Flowers in panicles 4. *Hieronima*.

Flowers with rudimentary petals (sometimes none in female flowers), in clusters 5. *Savia*.

Tribe II. *Picrodendroneæ*. Perianth wanting in male flower; single, the calyx, in female flower. Stamens indefinite in number, subtended by bracts. Ovary 2-celled, ovules 2 in each cell.

6. *Picrodendron*.

Tribe III. *Crotoneæ*. Perianth single, the calyx, or double, calyx and petals. Stamens in one or more series, the outer alternate with the sepals, or in the centre of the flower (opposite the sepals in *Tetrorchidium*). Ovules 1 in each cell.

Perianth double, calyx and petals (petals small in *Acidocroton* and *Argythamnia*, usually small or wanting in female flowers of *Croton*).

Inflorescence racemose or spicate.

Inflorescence terminal 7. *Croton*.

Inflorescence axillary.

Shrub. Stamens 4 8. *Argythamnia*.

Swamp herb. Stamens 10 9. *Caperonia*.

- Inflorescence paniculate.
- Calyx imbricate. Shrubs or herbs..... 18. *Jatropha*.
 - [Calyx valvate. Trees *Aleurites*.]
 - Flowers in clusters..... 19. *Acidocroton*.
- Perianth single, the calyx.
- Inflorescence spicate or racemose, axillary.
 - Bracts ovate-lanceolate, without glands.
 - Male calyx closed in bud, splitting valvately.
 - Styles free or very shortly united at base.
 - Anther-cells crosswise 4-globose. Styles much divided 10. *Bernardia*.
 - Anther-cells oblong, contiguous, parallel.
 - Shrubs. Male inflorescence usually unbranched. Styles 3 12. *Lasiocroton*.
 - Trees. Male inflorescence much branched. Styles 2 13. *Alchornea*.
 - Anther-cells free, hanging from the apex of the filament. Styles usually with many branches 14. *Acalypha*.
 - Male sepals valvate. Styles united below, undivided.
 - Stamens numerous. Shrubs or trees .. 15. *Acidotom*.
 - Stamens 3-1. Twining herbs with stinging hairs 16. *Tragia*.
 - Male sepals slightly imbricate. Anthers opposite the sepals, sessile, 4-celled.
 - Stigmas sessile, 2 20. *Tetrorchidium*.
 - Flowers several on reduced cushion-like leafy shoots 11. *Adelia*.
- Inflorescence; clusters of sessile or stalked flowers in the axils of much smaller upper leaves, not reduced to bracts, without glands 21. *Chatocarpus*.
- Inflorescence racemose or paniculate, terminal or in upper axils. Bracts without glands.
- Male flowers below, female several together above. Stamens very numerous, filaments much branched 17. *Ricinus*.
 - [Male flowers above, female several together below. Stamens 10 *Manihot*.]
- Inflorescence paniculate, at apex of branches, flowers several together in the axils of leafy 2-glandular bracts, female solitary here and there amongst the numerous male flowers ... 22. *Omphalea*.
- Inflorescence spicate, axillary or terminal. Bracts broad, truncate, generally 2-glandular.
- Male sepals distinct. Spikes terminal or axillary 23. *Dendrocousinsia*.
 - Male calyx lobed.
 - Filaments free. Spikes axillary..... 24. *Sapium*.
 - Filaments united. Spikes terminal.
 - Stamens 3. Ovary 3-celled 25. *Grimmeodendron*.
 - Stamens 2. Ovary 6-9-celled 26. *Hippomane*.
- Perianth of male flower wanting, or rudimentary, consisting of a more or less complete rim, of the female flower cup-shaped 28. *Hura*.
- Perianth wanting in male and female flowers..... 27. *Gymnanthes*.

Tribe IV. *Euphorbieæ*. Involucre enclosing several male flowers, and one female flower, simulating an hermaphrodite flower; the male flower consisting of a single stamen, jointed to a pedicel, with or without a minute scale at the joint; the female flower consisting of an ovary on a pedicel, with or without 3 minute scales. Ovary 3-celled, ovules solitary in each cell.

- Involucre regular, calyx-like 29. *Euphorbia*.
 Involucre irregular, oblique 30. *Pedilanthus*.

1. PHYLLANTHUS L.

Herbs, shrubs, or trees. Leaves entire, alternate (very rarely opposite), in two vertical rows, well developed, or small or scale-like; petiole either wanting or very short, to one-tenth the length of the blade, but in *P. glabellus* long, one-third to one-half the length of the blade. Flowers generally monoecious (diœcious in

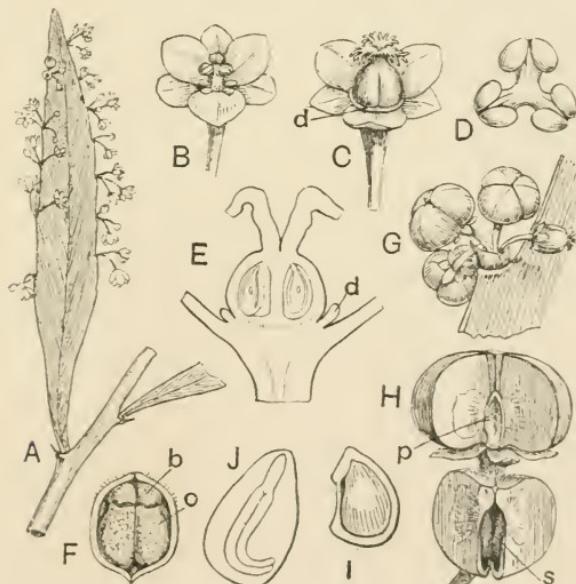


Fig. 85.—*Phyllanthus epiphyllanthus* L.

- A, Flowering branch $\times \frac{2}{3}$.
 B, Male flower $\times 5$.
 C, Female flower $\times 5$; d, disk.
 D, Apex of staminal column, looking down on it $\times 15$.
 E, Longitudinal section of ovary with styles $\times 8$; d, disk.
 F, Ovary of *P. grandifolius* L. cut open, (A and E from unpublished drawings by Schleiden in Herb. Mus. Brit. F after Baillon.)
 much enlarged; o, ovule; b, obturator.
 G, Notch of flowering branch with cluster of capsules, one unripe, $\times 1\frac{1}{2}$.
 H, Capsule with one coccus turned down $\times 4$; p, persistent axis; s, seeds.
 I, Section of coccus enlarged.
 J, Section of seed enlarged.
 J after Engler.)

P. nobilis), small, in clusters in the axils or at the nodes of leafless branches, or on modified flowering branches which are flattened or leaf-like, notched, with the flowers at the notches, without petals, male generally numerous, female few or solitary in the same axil or on a different branch. Male flowers: Sepals 5, 6, or 4, imbricate in two series, all similar or the outer shorter, herbaceous or subpetaloid. Disk of six separate glands. Stamens 2, 3, 4, or 5 in the centre of the flower. No rudimentary ovary. Female flowers: Sepals like those of the male. Disk saucer-shaped or cup-shaped, of separate glands in *P. latifolius*. Ovary 3-celled (12-6-celled in *P. reticulatus*). Styles wanting or developed, free or united more or less in lower half, 2-branched, 2-lobed, or cut into many segments. Ovules two in each cell. Capsule splitting up into 2-valved cocci. Seeds 3-sided, usually attached below the top, without a caruncle.

Species nearly 600, mostly in the tropics and sub-tropics, rarer in temperate regions.

A. Leaves well developed; flowering branches not flattened nor leaf-like.

Petiole, either wanting or very short, to one-tenth the length of the blade.

Sepals in both sexes 5 or 6.

Stamens 3.

Shrubs or trees.

Sepals 3-4 mm. l. Leaves to 10 cm. l.... 1. *P. nutans*.

Sepals not over 2 mm. l. Leaves not over 6 cm. l.

Leaves acuminate, 4·5-2 cm. l..... 2. *P. acuminatus*.

Leaves obovate, 6-3 cm. l..... 3. *P. portoricensis*.

Leaves ovate to roundish, about ·5 cm. l. 4. *P. Fadyenii*.

Herbs or undershrubs. Sepals not over 1·5 mm. l. Leaves not over 2 cm. l.

Terrestrial. Stems not spongy at base.

[Leaves oblong, apiculate, 2-·5 cm. l.

Seeds transversely wrinkled.....

P. Urinaria.]

Leaves obovate, 1·2-·6 cm. l. Seeds minutely papillose.....

5. *P. carolinensis*.

Leaves oblong-elliptical or oblong-obovate, rounded at apex, 1·8-1 cm. l. Seeds with 5 or 6 lines along the back.....

6. *P. niruri*.

Aquatic. Stem at base spongy. Leaves elliptical, ·5-·4 cm. l.

7. *P. aquaticus*.

Stamens 5.

[Shrub or tree. Sepals 2-2·5 mm. l.

Leaves elliptical or oblong-elliptical, 2-3·5 cm. l.....

P. reticulatus.]

Herb. Sepals ·6 mm. l. Leaves obovate-elliptical, ·6-1·5 cm. l.....

8. *P. minor*.

- Sepals of male flower 4, of female 5 or 6,
1-2 mm. l. Leaves 7-13 cm. l. Stamens 3-2.
Racemes or panicles, 2-5 together from small
knobs on the main trunk.
- Anthers 3 9. *P. cladanthus*.
 Anthers 2 10. *P. cauliflorus*.
 Racemes in axils of leaves 11. *P. axillaris*.
- Sepals in both sexes 4, 1-2 mm. l. Leaves
3-13 cm. l. Stamens 4.
Flowers diœcious. Fruit barely 1 cm. in diam. 12. *P. nobilis*.
[Flowers monœcious. Fruit 1-5 cm. in diam. *P. distichus*.]
Petiole long, $\frac{1}{3}$ - $\frac{1}{2}$ the length of the blade 13. *P. glabellus*.
- B. Leaves almost always wanting, represented by
deciduous scales. Flowering branches flattened,
expanded, generally leaf-like.
- Flowering branches spirally scattered, penultimate
branches normal 14. *P. epiphyllanthus*.
 Flowering branches in 2 vertical rows, penultimate
branches more or less modified.
- Penultimate branches persistent, younger parts
slightly modified. Flowering branches
sometimes in more than 2 rows 15. *P. montanus*.
 Penultimate branches deciduous, modified.
Flowering and penultimate branches dis-
similar in form.
- Pedicels shorter than 3 mm. Sepals 1.5-1.5
mm. l.
Disk of female fl. saucer-shaped 16. *P. angustifolius*.
Disk of female fl. of separate glands 17. *P. latifolius*.
Pedicels 3-7 mm. l. Sepals 1.5-3 mm. l.
Disk of female fl. $\frac{1}{4}$ - $\frac{1}{3}$ the length of ovary.
Styles not united 18. *P. speciosus*.
Styles united, erect.
Male and female fls. unequal in size 19. *P. inequaliflorus*.
Male and female fls. equal in size 20. *P. Coxianus*.
Disk of female fl. and stylar column
each about as long as ovary 21. *P. Swartzii*.
- Flowering and penultimate branches similar
and linear 22. *P. linearis*.

- A. Leaves well developed; petiole either wanting or very
short, to one-tenth the length of the blade, or (in *P.*
glabellus) long, one-third to one-half the length of the
blade; flowering branches normal.

1. *P. nutans* Sw. *Prodr.* 27 (1788) & *Fl. Ind. Occ.* 1103; shrubs
or trees, 4-30 ft. high; leaves variable in size even on the same
twig, 1-10 cm. l., elliptical to ovate, glabrous; sepals of male
flower 5 or 6, about 3 mm. l., elliptical to obovate, of female
flower 5 or 6, about 4 mm. l., elliptical-obovate; filaments united
into a column; anthers 3, horizontal from apex of column;
styles united half-way, free parts reflexed, 2-branched.—*Jacq.*
Hort. Schoenbr. ii. 35, t. 193; *Griseb. Fl. Br. W. Ind.* 33; *Baill.*
Adansonia ii. 15; *Muell. Arg. in DC. Prodr.* xv. pt. 2, 375. *Tilia*

forte arbor racemosa &c. *Sloane Cat.* 135 & *Hist. ii.* 19, *t.* 158, *f.* 3. Specimen from Swartz in *Herb. Mus. Brit.*

Sloane Herb. v. 66, 67! *Wright!* *Dancer!* *Swartz!* *Macfadyen!* above Cave R., St. Ann, *Purdie!* near Moneague, *Prior!* *Wilson!* *March!* J.P. 1061, 1326, *Morris!* Rock Fort, *Campbell!* Golden Valley, St. Thomas, 1000 ft.; near Hope, 700-800 ft.; Great Goat Is.; Potsdam, 2600 ft.; Fish River Mts.; near Dolphin Head; Croft's Mt., Clarendon, 2500 ft.; *Harris!* Fl. Jam. 5423, 6412, 6574, 6602, 8601, 8950, 9301, 9337, 9778, 10,260, 10,309, 11,212; Union Hill, near Moneague, *Britton & Hollick* 2747!—Cuba, Hispaniola.

Petioles 1-3 mm. l. *Stipules* ovate-lanceolate, 1·5-3 mm. l., deciduous. *Flowers* red, solitary or 2-5 in clusters, or racemose, or panicle-like on slender branches from which the leaves have dropped; pedicels 1-3 cm. l. *Male flowers:* *Disk* of 5-6 glands. *Female flowers:* *Disk* saucer-shaped, crenate. *Capsule* globular, 9-10 mm. in diam., slightly fleshy on the outside. *Seeds* 1-2 in each cell, pointed at apex, flattened at the other end, 5-7 mm. l.

2. *P. acuminatus* *Vahl Symb. ii.* 95 (1791); shrub or much branched tree, 8-25 ft. high; twigs green, more or less puberulous, angular; leaves 2-4·5 cm. l., ovate, acuminate or shortly acuminate, glabrous, but sometimes puberulous on nerves, margin, and petiole; sepals of male flower about 1 mm. l., 3 outer deltoid, about 2 mm. br., 3 inner ovate, about ·5 mm. br., of female flower about 1·5 mm. l., 3 outer broadly ovate, 3 inner oblong-ovate; filaments united into a column; anthers 3, horizontal from apex of short column; styles free, 2-branched, reflexed.—*Baill. Adans. i.* 33 & *ii.* 15; *Muell. Arg. in DC. Prodri. xv. pt. 2,* 381. *P. Conami Sw. Prodri.* 28 (1788) & *Fl. Ind. Occ.* 1105.

Wright! *Hartweg* (fide Baillon); near Castleton, *Harris!* Fl. Jam. 8409, 11,147.—Cuba, Martinique, St. Vincent, Trinidad, tropical continental America.

Petiole 3-4 mm. l. *Stipules* linear-lanceolate, 1·5-2 mm. l. *Flowers* numerous, one female, the rest male, in axillary clusters. *Male flowers:* *Pedicels* about 3 mm. l., several together. *Disk* of 3 glands. *Female flowers:* *Pedicels* about 13 mm. l., one in each cluster, thickened and angled at apex. *Disk* of 3 large bigibbous glands united laterally to form a cup. *Capsule* 3·5-4 mm. l., surface net-veined. *Seeds* about 2·5 mm. l., reddish-brown, keeled on the back.

3. *P. portoricensis* *Urb. Symb. Ant. iv.* 388 (1910); shrub 12 ft. high, glabrous; leaves 3-6 cm. l., obovate, base cuneate; flowers diœcious (?); sepals of female flower 5 or 6, obovate to ovate, about 1 mm. l.; styles free, 2-5-lobed, spreading.—*Diasperus portoricensis* *Kuntze Rev. Gen. Pl. ii.* 602 (1891). A specimen from Kuntze in *Herb. Kew.*

Hope grounds, 700 ft. *Harris!* Fl. Jam. 12,193, 12,344, 12,398.—Porto Rico.

Petiole 5-10 mm. l. *Male flowers* not known. *Female flowers* greenish-yellow, several together in axillary clusters; pedicels 2-4 mm. l. *Sepals*:

outer obovate, inner ovate. Disk saucer-shaped with undulate margin. Fruit globular, 6–7 mm. in diam., outer coat fleshy, milky-white, enclosing 3 cocci. Seeds 3-cornered, 2 mm. l., somewhat reddish-brown, smooth.

4. *P. Fadyenii* Urb. *Symb. Ant.* vi. 13 (1909); shrub, glabrous; leaves 4–5 mm. l., upper elliptical or shortly ovate, leathery, apex rounded, generally obsoletely apiculate, base emarginate, the lower roundish; sepals of male flower 5, 1·2 mm. l., roundish, of female flower 5, 2 mm. l. (in fruit); filaments 3, free; anthers opening longitudinally.—*P. orbicularis* Griseb. *Fl. Br. W. Ind.* 34 (1859) (as regards the Jamaican plant) (non *H. B. & K.*). Type in Herb. Kew.

Macfadyen!

Stipules linear-awl-shaped, persistent, 1·5–5 mm. l. *Flowers* in the axils, generally solitary. *Pedicels* of male flower about 1 mm. l., of female to 3·5 mm. l. *Disk* of 5 glands. *Female flowers*: *Sepals* obovate.

[*P. Urinaria* L. *Sp. Pl.* 982 (1753); an erect or procumbent annual herb (occasionally perennial), 4–16 inches (and more) high; stem and branches minutely hispid at the angles; leaves 5–2 cm. l., oblong, sensitive, tip rounded or apiculate, margin often minutely hispid; flowers subsessile; sepals of male flowers 6, about 5 mm. l., of female flowers 6, about 7 mm. l., oblong, 1-nerved; filaments united into a column; anthers 3, erect, united, opening vertically; styles free; seeds transversely wrinkled.—*Muell. Arg. in DC. Prodr.* xv. pt. 2, 364; *Hook. f. Fl. Brit. Ind.* v. 293; *Urb. Symb. Ant.* vi. 89; *Hutchinson in Fl. Trop. Afr.* vi. pt. 1, 721. *P. leprocarpus* Wight *Ic. t.* 1895, f. 4 (1852). *P. foliis pinnatis floriferis, floribus sessilibus caule herbaceo procumbente* L. *Fl. Zeyl.* 157. Type in Herb. Hermann in Herb. Mus. Brit.]

Naturalized; Hope river valley; Hope grounds; Castleton grounds; Bath; Harris! *Fl. Jam.* 9980, 12,082, 12,142, 12,155, 12,195.—Tropical Asia, Australia, Pacific Is., rare in Africa.

Stipules lanceolate-acuminate from a peltate base. *Flowers* greenish, minute, solitary in the axils, males in the uppermost part of the branch. *Male flowers*: *Sepals* obovate-elliptical. *Disk* composed of separate minute glands. *Female flowers*: *Sepals* persistent, reflexed in fruit. *Disk* saucer-shaped, margin irregularly toothed. *Ovary*, surface densely granulate. *Styles* short, 2-cleft. *Capsule* about 2 mm. in diam., depressed-globular, sometimes with minute spines on the surface. *Seeds* about 1·3 mm. l.]

5. *P. carolinensis* Walt. *Fl. Carol.* 228 (1788); herb, becoming woody below, 2–11 inches high, glabrous; branches spreading, or stiff and erect; leaves 6–11(–20) mm. l., membranous, obovate or oblong-obovate, apex rounded or blunt; sepals of male flower 6, about 5 mm. l., obovate-roundish, of female flower 6, 5–1 mm. l., increasing to about 1 or 1·5 mm. in fruit, linear-ob lanceolate:

filaments 3, free; styles free, 2-branched, horizontal.—*Michx. Fl. Bor. Am.* ii. 209; *Muell. Arg. in DC. Prodr. xv. pt. 2*, 399. *P. obovatus* *Muehlenb. ex Willd. Sp. Pl. ed. 4, iv.* 574 (1805); *A. Rich. in Sagra Cub. xi.* 215.

Belle Vue, near Spanish Town; Castleton grounds, 500 ft., *Harris!* *Fl. Jam.* 12,046, 12,143.—Cuba, Hispaniola, Martinique, northern S. America, Central America and northwards to Pennsylvania.

Petiole scarcely 1 mm. l. *Stipules* about .5 mm. l., triangular, acute, scarious at tip and margin. *Flowers* a few, subsessile in axils, male and female. *Pedicels* .5-1 mm. l. *Disk* of male flowers composed of distinct glands; of female flowers saucer-shaped. *Capsule* globular-depressed, nearly 2 mm. in diam. *Seeds* 3-cornered, minutely papillose (under a strong lens), about 1 mm. l.

6. *P. niruri* *L. Sp. Pl.* 981 (1753); annual herb, 6 inches-2 ft. high, glaucous; flowering branches angular to 1 dm. l.; leaves 1-1.8 cm. l. in the middle of the twig, shorter above and below, oblong-elliptical or oblong-obovate, rounded to blunt at both ends, membranous, glabrous; pedicels 1-2 mm. l.; sepals 5-6, unequal; of male flowers .5-.8 mm. l., ovate, of female about 1 mm. l., elliptical-ovate; filaments united into a column; anthers 3, distinct; styles free, very short, each with two very short branches.—*Wight Ic. t.* 1894; *Griseb. Fl. Br. W. Ind.* 34; *Muell. Arg. in DC. Prodr. xv. pt. 2*, 406 & in *Fl. Bras. xi. pt. 2*, 53; *Hook. f. Fl. Brit. Ind.* v. 298; *Watt Econ. Prodr.*; *Urb. Symb. Ant.* iv. 338; *Hutchinson in Fl. Trop. Afr.* vi. pt. 1, 731. *P. foliis...pedunculatis &c. L. Fl. Zeyl.* 157. *Urinaria indica* &c. *Burm. Zeyl.* 230, t. 93, f. 2. Type in *Herb. Linn.*

Macfadyen! Distin! Arnott! Kingston, Prior! Port Antonio, Millspaugh; Kingston, Hitchcock; Porus, C. G. Lloyd; King's House grounds, T. J. Harris! Hope grounds, 700 ft.; *Harris!* *Fl. Jam.* 6675, 6773, 6855, 12,136.—Widely spread in the Tropics, naturalized in Bermuda.

Petiole about 1 mm. l.; stipules lanceolate-awl-shaped, scarcely 1 mm. l. *Flowers* clustered 2 together, 1 male and 1 female, or each solitary, in axils of leaves. *Male flowers*: *Disk* of separate glands. *Female flowers*: *Disk* saucer-shaped, with 5-6 lobes. *Capsule* depressed-globular, 2-2.3 mm. in diam. *Seeds* with 5 to 6 lines along the back, about 1 mm. l.

The root is a remedy for jaundice; half an ounce of the fresh root is rubbed in a cup of milk, and given night and morning. An infusion of the tender roots is valuable in chronic dysentery. The properties of *P. Urinaria* are identical with those of this species. (Watt)

7. *P. aquaticus* *C. Wright in Sauvalle Fl. Cub.* 124 (1868); erect herb, to 2½ ft. high, sometimes procumbent at base, growing amongst sedges and coarse grasses in boggy ground; stem spongy with a loose bladder-like epidermis at base when growing in water; leaves 4-5 mm. l., elliptical, with rounded apex, subsessile; sepals of male flower 5, 1 mm. l., obovate-roundish, of female flower 5, 1.5 mm. l., elliptical; filaments united into a staminal column: anthers 3, distinct, opening horizontally; styles 2-branched.

Hollis's Savanna, Clarendon, 2400 ft.; Cornwall, St. Elizabeth; Harris! Fl. Jam. 12,224, 12,555.—Cuba.

Stipules triangular, acuminate, about 1 mm. l. Flowers solitary in axils, or 2 or 3 together, male and female mixed; pedicels about 1 mm. l. Male flowers: Disk of 5 separate glands. Anthers sessile at apex of column. Female flowers: Disk saucer-shaped with wavy or shortly-lobed margin. Styles 3, each with two short branches. Capsule (not seen) depressed, with the sepals persistent, generally becoming larger (fide Wright). Seeds (not seen) longitudinally striate, with numerous transverse lines (fide Wright).

[*P. reticulatus* Poir. Encyc. v. 298 (1804); shrub or small bushy tree, 6–10 ft. high; leaves 2–3·5 cm. l., elliptical or oblong-elliptical, glabrous; sepals of male flower 5 or 6, 2–2·5 mm. l., outer elliptical, inner obovate, of female flowers 5–6 (4–7), 2–2·5 mm. l., outer elliptical, inner obovate or roundish; filaments 3 (or 2) inner more or less united, fleshy, 2 (or 3) outer short, slender or abortive with the anthers sessile at the base of the other filaments; anthers erect, opening vertically; styles wanting, branches minute, 2-lobed.—Muell. Arg. in DC. Prodr. xv. pt. 2, 344. Hook. f. Fl. Brit. Ind. v. 288. *P. jamaicensis* Griseb. Fl. Br. W. Ind. 34. *Anisonema reticulatum* A. Juss. Euph. Tent. t. 4, f. 11 (1824). *A. multiflorum* Wight Ic. t. 1899 (1852).

Naturalized; Macfadyen! Woods above Bath, Purdie! Wilson! Plantain Garden River, Harris & Britton! cult. Castleton Garden! Fl. Jam. 10,677.—East Indies, Malaya, China, Tropical Africa.

Petiole 2–3 mm. l. Stipules triangular. Flowers axillary, 5–2 in a cluster, one female, the rest male. Pedicels slender, unequal, 3–4 times as long as the petiole. Disk of minute glands. Ovary globular, 12–6-celled; styles wanting; stigmas minute, 2-lobed. Capsule leathery or fleshy, subgranulate, 2–3 mm. in diam. Seeds 8–16, irregularly 3-cornered, granulate, punctulate.]

8. *P. minor* Fawc. & Rendle in Journ. Bot. lvii. 65 (1919); herb, woody below, 1½–2 ft. high, glabrous; leaves 6–15(–19) mm. l., 4–8 mm. br., lateral nerves 2–4 on each side; sepals 5, ·6 mm. l., of male roundish, of female flower ovate, sometimes as long as ·9 mm. in fruit, with a greenish midrib; filaments free; anthers rounded, opening laterally; styles free, slender, 2-branched to about the middle, spreading or reflexed.—*P. nummulariaefolius* Britton in Journ. Torr. Bot. Club xliv. 36 (1917), (non Poir.). Type in Herb. Jam.

Hope grounds, 700 ft., Harris! Fl. Jam. 12,123, 12,157, 12,208.

Leaves obovate-elliptical, apex blunt or rounded, base cuneate, thinly membranous; petiole 1 mm. l.; stipules awl-shaped, 1 mm. l. Flowers solitary or clustered in axils; pedicels slender, shorter than the leaf, 4–5 mm. l. Male flowers: Disk of 5 shortly obovate, truncate glands. Stamens 5. Female flowers: Disk saucer-shaped, entire. Capsule depressed-globular, 2 mm. in diam. Seeds 3-angled, semi-circular on back, light brown colour, minutely and closely papillose, ·8 mm. l.

✓ 9. *P. cladanthus* Muell. Arg. in *Linnæa*, xxxii. 46 (1863) & in *DC. Prodr.* xv. pt. 2, 413; slender tree, 21–30 ft. high; trunk at base not more than 1 dm. in diam. tapering to 2·5 cm. at apex; branches 3 or 4 at intervals, erect; leafy branchlets several crowded together at apex of trunk and branches; leaves about 1 dm. l., about 4 cm. br.; flowers in racemes or panicles, 2–5 together from small knobs on the main trunk and sometimes on the branches; sepals of male flower 4 (or 5), unequal, 1–2 mm. l.; anthers 3–4, united at the apex, diverging towards the base; sepals of female flower 5; ovary oblong-ovoid; stigmas sessile, broad, spreading, reflexed.—*P. cauliflorus* Griseb. *Fl. Br. W. Ind.* 33 (1859) (in part). Type in Herb. Kew.

Wilson! near Troy, 2500 ft., *Harris!* John Crow (Blake) Mts., eastern slopes of south end, *Harris & Britton!* *Fl. Jam.* 8722, 8761, 10,727.

Leaves ovate-elliptical, acuminate; stipules broadly triangular, thick, persistent, about 4 mm. l. and br. Pedicels several in clusters along the rhachis. Glands of male flower concave upwards, with irregular fleshy margin. Staminal column thick; sepals of female flower fleshy, elliptical to ovate, blunt. Glands of female flower small, linear-oblong in outline.

10. *P. cauliflorus* Griseb. *Fl. Br. W. Ind.* 33 (1859) (in part); Muell. Arg. in *Linnæa* xxxii. 46 (1863) & in *DC. Prodr.* xv. pt. 2, 412; tree about 20 ft. high; trunk 5 cm. in diam., bearing branches from the apex (like *Comocladia* or *Spathelia*) and the racemes below; branches simple, 1·5–3 dm. l., angled but not flattened; leaves 8–13 cm. l., 3–5 cm. br.; flowers in racemes or panicles which spring 2–3 together from small scaly knobs on the main trunk; sepals of male flower 4, sub-equal, about 1·5 mm. l., yellowish-green; anthers 2, united at apex of column, diverging obliquely below; sepals of female flower 5, unequal, 1·2–1·7 mm. l.; ovary cylindrical-ellipsoidal, the base 3-celled, the upper portion elongating to form a stout column after fertilization; stigmas sessile, flat, broadly triangular, with prominent lateral angles.—*Omphalea cauliflora* Sw. *Prodr.* 95 (1788). *Epistylium cauliflorum* Sw. *Fl. Ind. Occ.* 1099, t. 22, fig. e, f, h (1798). *Omphalea Epistylium* Poir. *Encyc. Suppl.* iv. 140 (1816) (in part). A specimen from Swartz named by him in Herb. Stockholm, and one in Herb. Mus. Brit.

Mts. in west, *Swartz!*

Leaves elliptical to oblong, acute or acuminate; petiole about 5 mm. l.; stipules broadly triangular, thick, persistent, 2 mm. br., 1·5 mm. l. Racemes 6–15 cm. l. Pedicels 12–20, about 3 mm. l. in clusters on minute tubercles. Glands of male flower fleshy, grooved along the upper face. Staminal column about half as long as the calyx. Sepals of female flower elliptical-oblong to ovate, fleshy, blood-red, persistent. Capsule (fide Swartz) oblong, obtusely 3-cornered, attenuated at the apex; seeds 2 in each cell.

11. *P. axillaris* Muell. Arg. in *DC. Prodr.* xv. pt. 2, 412 (1866); shrub 2–4 ft. high; branches flattened towards the

apex; leaves 7–12 cm. l., 3–5 cm. br., ovate or ovate-lanceolate, acuminate; racemes in axils 1·2–2·5 cm. l.; sepals of male flowers 4, sub-equal, yellowish-green; anthers 2, united at apex of column, diverging obliquely below; sepals of female flower 5, green, 3 larger roundish-ovate to 1·2 mm. l., smaller elliptical-oblong; ovary ellipsoidal; stigmas sessile, triangular, closely reflexed.—*Omphalea axillaris Sw. Prodr.* 95 (1788). *Epistylum axillare Sw. Fl. Ind. Occ.* 1097, t. 22, fig. a–d, g (1798); *A. Juss. Euphorb. Tent.* t. 3, fig. 8. *Phyllanthus Epistylum Griseb. Fl. Br. W. Ind.* 33 (1859). A specimen from Swartz named by him in Herb. Stockholm, and one in Herb. Mus. Brit.

Mts. in west, *Swartz*!

Petiole 2–3 mm. l. *Stipules* broadly triangular, acute or acuminate, leathery, persistent. *Flowers*: *Male* 4–8 in a cluster; pedicels 4–8 mm. l.; glands 4, broadly concave upwards; *female* generally solitary in the clusters; pedicel about 2 mm. l.; glands minute, oblong. *Capsule* broadly ellipsoidal, obtuse (fide Muell.). *Seeds* 1 in each cell.

✓ [P. distichus Muell. Arg. in DC. Prodr. xv. pt. 2, 413 (1866); tree 20–30 ft. high; older branches about as thick as a finger, from which the leaves have dropped, leaving large prominent scars; younger branchlets slender, leafy, deciduous; leaves 3–7·5 cm. l., ovate, acute, base somewhat oblique; flowers reddish, monoecious, minute, densely clustered; clusters axillary on leafy branches with long-stalked flowers, or on slender rhachises of the inflorescence springing several together at the axils of the scars of fallen leaves with short-stalked flowers; sepals of male flower scarcely 1 mm. l., obovate to roundish, of female flower about 1·2 mm. l., elliptical, persistent; filaments 4, free; anthers opening longitudinally; ovary 4–(3)-celled; styles 4, free, reflexed; fruit 1·5 cm. in diam.—Muell. Arg. in Fl. Bras. xi. pt. 2, 68; Hook. f. in Fl. Brit. Ind. v. 304; Urb. Symb. Ant. iv. 339; Watt Dict. Econ. Prodr. Ind.; Bailey Cyclop. Amer. Hort. fig. 1771. P. longifolius Jacq. Hort. Schoenbr. ii. 36, t. 194 (1797). Cicca disticha L. Mant. 124 (1767); Lam. Illustr. t. 757, f. 1: A. Juss. Euphorb. Tent. t. 4, f. 13, a; Griseb. Fl. Br. W. Ind. 32; Rheede Hort. Mal. iii. t. 47, 48.

Otaheite Gooseberry.

In gardens; Hope Gardens, Harris!—Warmer regions of the world.

Stipules narrowly triangular, acuminate, about 1 mm. l. *Disk* of male flowers of 4 free glands, of female narrowly saucer-shaped. *Fruit*: Pericarp fleshy, acid, when dry 6–8-lobed and splitting up into 3 or 4 cocci.

The fruits are not unlike gooseberries, but acid and astringent; they are eaten raw or dressed in various ways, pickled or made into preserves. The roots and seeds are purgative. (Watt)]

12. P. nobilis Muell. Arg. in DC. Prodr. xv. pt. 2, 414 (1866); tree 20–40 ft. high; leaves 4–13 cm. l., narrowly elliptical or oblong-elliptical, acute to subacuminate at both ends; flowers

diœcious, male clustered, female solitary in the axils of leaves; sepals 4 in 2 series, elliptical or roundish, of male 1·5 mm. l., of female 2 mm. l.; filaments 4, free; anthers opening longitudinally; ovary 5–4-celled (rarely 3-celled); styles united below, 5–3, 2-lobed or 2-cleft or variously divided; fruit barely 1 cm. in diam.—*Muell. Arg. in Fl. Bras.* xi. pt. 2, 69; *Urb. Symb. Ant.* iv. 339. *Euonymus margaritifera* &c. *Pluk. Phyt.* t. 176, f. 4. *Margaritaria nobilis* L. f. *Suppl.* 428 (1781) (excl. male plant). *Cicca antillana* A. *Juss. Euphorb. Tent.* t. 4, f. 13 b (1824); *Griseb. op. cit.*

Bastard Hog Berry.

Troy 1600–2200 ft.; *Harris!* Fl. Jam, 8698, 9450, 9490.—West Indies, tropical S. America, Panama.

Stipules triangular, acuminate, 3–4 mm. l., entire. *Disk* of both sexes entire, of the male adhering to the sepals below, of female narrow, ring-like. *Fruit*: Pericarp at first fleshy, at length drying up and dividing into 5–8 cocci, depressed-globular. *Seeds* somewhat plano-convex to 3-sided, smooth, greenish-brown, 3 mm. in diam.

13. *P. glabellus* *Fawc. & Rendle in Journ. Bot.* lvii. 68 (1919); petiole long, $\frac{1}{3}$ – $\frac{1}{2}$ the length of the blade. *P. tremulus* *Griseb. Fl. Br. W. Ind.* 34 (1859); *Muell. Arg. in DC. Prodr.* xr. pt. 2, 330. *Croton glabellum* L. *Amaen. v.* 383, 409, & *Sp. Pl. ed.* 2, 1425 (excl. syn. *Sloane & Browne*).

Browne! *Wright!* *Purdie!* *Wullschlaegel;* Round Hill, Santa Cruz Mts., 1600 ft.; Malvern to Mountainside, 400 ft.; *Harris!* Fl. Jam. 9707, 9903.—Type from Browne in Herb. Linn.

Shrub or small tree 6–15 ft. high. *Leaves* 3–9·5 cm. l., broadly elliptical, conspicuously lighter-coloured beneath, glabrous; stipules lanceolate-linear, ·5 cm. l., deciduous. *Male flowers* minute, clustered, lateral; pedicels slender, 9–11 mm. l. *Sepals* 10, in two series, the outer elliptical-oblong, 1·5 mm. l., the inner oblong-lanceolate, larger, to 2·5 mm. l. *Disk* saucer-shaped, crenate, ·6 mm. l. *Filaments* united into a short column, about ·5 mm. l. *Anthers* 4, close together, attached round the margin of the peltate connective, opening transversely. *Female flowers*: *Pedicels* solitary or a few together, about as long as those of the male, increasing in fruit to 3·5–4·5 cm. l. *Sepals* 10, the two series very unequal; outer series broadly oblong, ultimately 2 mm. l., inner series thin, linear-oblong, ultimately 3·5 mm. l. *Disk* cup-like, margin wavy or lobed, ·5 mm. l. *Style-branches* sessile on apex, 2-lobed, fleshy. *Capsules* at first somewhat fleshy, depressed-globular, 8–10 mm. in diam. *Seeds* 6–8, often all abortive, flattish ellipsoidal, buff-coloured, smooth, 4·5 cm. l.

B. Flowering branches flattened, generally leaf-like, of firm leathery texture, notched, with the flowers clustered in the notches. Branches ("penultimate branches") that bear the flowering branches, in *P. epiphyllanthus* normal, woody and rounded; in *P. montanus* slightly modified; in the rest similar in substance to the flowering branches, and more or less flattened and linear. The penultimate

branches of *P. epiphyllanthus* and *P. montanus* are permanent branches, growing on from the scaly apex at the next growing season; in other Jamaican species the penultimate branches are deciduous and the normal branches alone have the scaly apex continuing the growth. Normal leaves almost invariably wanting, but represented by scales, accompanied by stipules, at apex of branches, on edges of very young flowering branches, and at base of flowering and penultimate branches, both scale-leaves and stipules very deciduous.

a. Flowering branches spirally scattered; penultimate branches normal, persistent.

14. *P. epiphyllanthus* L. Sp. Pl. 981 (1753); Muell. Arg. in DC. Prodr. xv. pt. 2, 428; Urb. Symb. Ant. iv. 339. *P. falcatus* Sw. Fl. Ind. Occ. 1115 (1800); Griseb. Fl. Br. W. Ind. 35; Pluk. Phyt. t. 247, f. 4. *Phylanthos americana* &c. Commel. Amst. i. 199, t. 102; Catesb. Carol. ii. t. 26. *Xylophyllea falcata* Sw. Prodr. 28 (1788); Bot. Reg. t. 373. *X. epiphyllanthus* Britton in Ann. Miss. Bot. Gard. ii. 42 (1915). (Fig. 85.) Specimen named by Swartz in Herb. Mus. Brit. There are specimens of this species in Plukenet's Herbarium in Herb. Sloane without definite localities; see xcvi. 100, ci. 106, ccxxxii. 27.

Seaside Laurel, Rock Bush, Soap Plant, Sword Bush.
Purdie!—Bahamas, West Indies.

Shrub 2-15 ft. high, glabrous. Scaly cone at apex of branches and penultimate branches scarcely broader than branch. Scale-leaves 1·5-2·5(-4) mm. l., very broadly to narrowly triangular, more or less persistent at base of flowering branches; stipules rudimentary. Flowering branches generally strap-shaped or linear, sword-shaped to sickle-shaped, sometimes more or less lanceolate or oblanceolate, 6-14 cm. l., 10-16 (2-23) mm. br., striate with veins close together, 7-11-notched on each side, notches truncate. Male flowers: Pedicels slender, 1-3 mm. l. Sepals blood-red, 1-1·5 mm. l., outer oblong-elliptical, smaller than the broadly elliptical inner. Disk of 6 glands. Staminal column with 3 very short branches at apex. Anthers opening horizontally. Female flowers: Pedicels thick, 1-2 mm. l. Sepals like the male. Disk saucer-shaped. Styles united below, free parts flattened, much divided and recurved at apex. Capsule depressed-globular, 3-furrowed, 4·5-5 mm. in diam.

Soap is sometimes made from the ashes of the plant. A decoction is used as a gargle for sore throat. A poultice made from the plant is applied successfully to open sores and foul ulcers.

b. Flowering branches in 2 vertical rows; penultimate branches slightly modified, persistent.

15. *P. montanus* Sw. Fl. Ind. Occ. 1117 (1800); staminal column entire; styles 3, recurved, closely adpressed, 2-3-branched or lobed.—Muell. Arg. tom. cit. 429; Griseb. loc. cit. *Xylophyllea montana* Sw. Prodr. 28 (1788) & Ic. ined. t. 35. *X. latifolia*

Sw. Prodr. 28 (1788). Specimen from Swartz in Herb. Mus. Brit., also one named by him in Herb. Stockholm.

On limestone rocks in the west, *Swartz!* Pedro district, St. Ann, *Purdie!* Cascado of Falls R. near Kingston, *Prior!* near Troy, 2000 ft.; Holly Mount, Mt. Diablo, 2700 ft.; Dolphin Head, 1600 ft.; Fray Woods, 1650-1800 ft.; Peckham, Clarendon, 2500 ft.; *Harris!* Fl. Jam. 8736, 8986, 9251, 10,338, 10,991, 11,013, 12,797.

Shrub or tree 5-25 ft. high. *Scaly cone* at apex of branches and penultimate branches scarcely as broad as upper part of branch. *Scale leaves* and *stipules* minute, 1-1.5 mm. l., deltoid, very deciduous. *Flowering branches* varying much in size and form, lanceolate to oblong or elliptical, 5-15 cm. l., 1-4 cm. br., outline wavy, notched almost through their whole length; notches usually indistinct, shallow; veins oblique, close together. *Normal leaves* occasionally occurring, elliptical, 7-10 mm. l., on branches very slightly expanded or broad like the flowering branches. *Flowers* many in a cluster, 4-12 male, 1 female. *Pedicels* 2 mm. l. to shorter than the calyx. *Male flowers*: *Sepals* 5(4), pale red, 1-1.2 mm. l., more or less unequal, broadly elliptical, somewhat leathery. *Disk* of fleshy glands somewhat concave at apex. *Anthers* 3, sessile, cells united at back, opening horizontally. *Female flowers*: *Sepals* 5, dark purple, somewhat leathery, roundish or ovate-roundish, unequal, 1-1.2 mm. l. *Disk* of 5 separate flat elliptical glands. *Capsule* globular, 4 mm. in diam. *Seeds* light brown, 2 mm. l.

c. Flowering branches in 2 vertical rows; penultimate branches modified, deciduous.

16. *P. angustifolius* *Sw. Fl. Ind. Occ.* 1111 (1800); pedicels 2-3 mm. l.; sepals 1-1.5 mm. l.; filaments united usually above the middle, free above; anther-cells separate; styles 3 or 4, united at the base, recurved, cut halfway into 2-4 narrow branches, and often subdivided.—*Griseb. loc. cit.*; *Muell. Arg. tom. cit.* 430 (incl. vars.). *Phyllanthus foliis angustis &c.* *Browne Hist. Jam.* 188 (?). *Xylophylla angustifolia* *Sw. Prodr.* 28 (1788) & *Ic. ined. t. 36*; *Lodd. Bot. Cab. t. 577*. *X. elongata* *Jacq. Hort. Schoenbr. iii. 54, t. 348* (1798); *Lodd. Bot. Cab. t. 1091*. *X. montana* *Bot. Mag. t. 2652* (1826) (non *Sw.*). Specimens from Swartz in Herb. Mus. Brit. and in Herb. Stockholm. Specimen apparently from Browne in Herb. Linn. named *Phyllanthus Epiphyllanthus* in Solander's hand.

Barham in Herb. Sloane clxii. 285! *Broughton!* stony and rocky places in the west, *Swartz!* *Macfadyen!* *Distin!* Yallahs R., *Purdie!* *Lane!* Lucea, *Hitchcock*; Sheldon, Blue Mts.; near Hagley Gap, 1600 ft.; near Cinchona; Yardley Chase, 1600 ft.; near lighthouse, Negril; Orange Bay Point, Hanover; *Harris!* Fl. Jam. 5830, 8592, 9666, 10,233, 10,262.—Cuba.

Shrub, 2-10 ft. high. *Bark* of young twigs reddish-brown, becoming ash-coloured. *Scaly cone* up to three times as broad as the upper portion of twig, somewhat globular. *Scale leaves* linear, acuminate, about 3 mm. l.; stipules broadly triangular, acute or blunt, about 3 mm. l., ciliate with rusty-red pubescence. *Penultimate branches* usually 6-11 cm. l., 1.5-2 mm. br., apical flowering branches generally paired; sometimes (var.

elongatus) the terminal portion becomes (especially in cultivated specimens) much elongated (to 2 dm. l.) and broader than below (to 3·5 mm. br.), bearing flowers. *Flowering branches* lanceolate, linear-lanceolate, strap-shaped but narrowed to both ends, to oblanceolate, straight or slightly curved, with blunt or acuminate apex, usually 9·5 cm. l., 11·4 mm. br.; notches 5·7(-9) on each side, distant, few below the middle, truncate, with conspicuous cushions; veins irregularly unequal, close together. *Pedicels* 2-4. *Sepals* 6, outer elliptical with brownish apex, about 1 mm. l., inner rhomboid or broadly-elliptical, about 1·3(-1·5) mm. l. *Disk* of male flower, of 6 subsessile, roundish, concave glands; of female flower saucer-shaped, 6-lobed, the lobes often irregular, rarely scarcely united below. *Capsule* globular, 4·4·5 mm. in diam.

After an examination of a fragment of the type of *Xylophylla contorta* Britton (Bull. Torr. Bot. Club, xxxvii. 353 (1910)) kindly sent by Dr. Britton, we are unable in the absence of flowers to separate it from the above species.

17. *P. latifolius* Sw. *Fl. Ind. Occ.* 1109 (1800); pedicels 2 mm. l. to shorter than sepals; sepals 5-1 mm. l.; filaments 3 (2-1), united to middle or beyond, free above; anthers united at the back; disk of female flower of minute separate glands; styles 3, united in lower half, free above, erect, branches 2-3(-5) cleft, recurved.—*Griseb. loc. cit.* *P. isolepis* Urb. *Symb. Ant.* iii. 290 (1902); *Pluk. Phyt.* t. 36, f. 7. *Lonchitidi affinis* &c. (including the variety) *Sloane Hist.* i. 80. *P. foliis latioribus* &c. *Browne Hist. Jam.* 188. *Xylophylla latifolia* L. *Mant.* 221 (1771); *Sw. Prodr.* 28 (1788) & *Obs. Bot.* 113 (1791). Specimen named by Swartz in *Herb. Mus. Brit.* Specimen apparently from Browne in *Herb. Linn.* named *Phyllanthus Epiphyllanthus* in Solander's hand.

Sloane Herb. i. 62! *Liguanea, Barham* in *Herb. Sloane clxii.* 285! *Shakspear! Masson! McNab!* *Healthshire Hills, Purdie! March!* *Port Antonio, Hitchcock!* *Ferry Pen, 150 ft., Campbell!* *Long Mountain, west, 800 ft; Cane R. valley, 250-400 ft.; Harris!* *Healthshire Hills, Harris & Britton!* *Fl. Jam.* 6280, 8843 (8845, 9334, 9339 without flowers), 9631, 10,065, 10,523. *Fl. Jam.* 10,523 matches a specimen from Masson named *Xylophylla latifolia* by Swartz in *Herb. Mus. Brit.* McNab's specimen in *Herb. Edinburgh* is named *P. latifolius* in Grisebach's handwriting.

Shrub or *small tree* to 10 or 12 ft. high. *Bark* ash-coloured, soon becoming roughish, with conspicuous scars. *Scaly cone* at apex of branches broader than branch. *Scale leaves* and *stipules* narrowly triangular, acuminate, or linear-acuminate on young twigs, 3-8 mm. l. *Penultimate branches* slightly notched, 1-2 dm. l., 1·5-2 mm. br. *Flowering branches* in two vertical rows, rhomboid, rhomboid-lanceolate, or oblanceolate, generally acuminate at both ends, 5-8 (3·5-8·5) cm. l., 1-2·5 cm. br.; notches 10-16(-19) on each side, generally above the middle, dense, with prominent cushions formed by bracteoles of several flowers, striated by the principal, somewhat distant veins. *Flowers* red, several, sometimes numerous. *Male flowers*: *Sepals* 6 (or 5), unequal, outer generally linear-oblong to obovate, apex brownish, 5-7 mm. l., inner obovate or sub-rhomboid, 8-1 mm. l. *Disk* of 6 shortly stalked glands. *Sepals* of *female flowers* like those of male. *Capsule* globular, base truncate or slightly hollowed, brownish, 2·5-3 mm. in diam., 2 mm. l. *Seeds* about 1·7 mm. l., brownish.

18. *P. speciosus* Jacq. *Collect. ii.* 360 (1788) & *Ic. Pl. Rar.* t. 616; pedicels about 6 mm. l., in fruit to 1 cm. l.; sepals 1·5–1·7 mm. l. (in the female flower increasing in the fruit); filaments 3, united halfway from the base, free above, diverging; connective of anthers diverging, cells separate, opening horizontally; styles short, spreading, 2–3-divided, branches recurved. —*Sw. Fl. Ind. Occ.* 1107 (1800); *Griseb. loc. cit.*; *Muell. Arg. tom. cit.* 431. *P. arbuscula* Steud. *Nomencl. ed. 2* (1841). *Xylophylla arbuscula* *Sw. Prodr.* 28 (1788) & *Ic. Ined. t. 34*. *X. latifolia* *Bot. Mag. t. 1021* (1807) (non *L.*). Specimens from Swartz in Herb. Mus. Brit. and in Herb. Stockholm.

Broughton! "Catherine Hill," Swartz! Bancroft! March! John Crow Mt., 4000 ft., J.P. 1263, Hart! Silver Hill, Bot. Dept.! near Troy, 2000–2500 ft.; Harris! Fl. Jam. 8565, 8714, 8771, 9368.

Shrub or small tree, 6–20 ft. high. *Scaly cone* at apex of branch large, much broader than branch; *scale-leaves* and *stipules* lanceolate to linear, acuminate, 4–8 mm. l. *Penultimate branches* 1–3 dm. l., 1·5–2 mm. br. *Flowering branches* in two vertical rows, broadly lanceolate, acuminate, slightly curved or straight, 4–7 cm. l., usually 1–2 cm. br.; notches 10–14 on each side, indistinct, with cushions small, at length more developed, with larger cushions, striated only by the principal, somewhat distant veins. *Pedicels* 3–6 from each cushion. *Male flowers* pale red or white. *Sepals* 5 or 6, elliptical-ovate or oblong, outer with brownish apex. *Disk glands* 5 or 6, somewhat concave, very shortly stalked. *Female flowers* blood-red. *Sepals* 5 or 6, roundish-elliptical or rhomboid-elliptical, outer with brownish apex, green (Swartz). *Disk* saucer-shaped, margin wavy or 6-lobed, ·3 mm. l., about one-fourth to one-third the length of the ovary. *Capsule* depressed-globular, 3-furrowed, about 5 mm. l. *Seeds* ovoid, brownish, about 3·5 mm. l.

The specimens from Troy have shorter ovate blunt scales, about 3 mm. l., and distinct notches.

19. *P. inæqualiflorus* Fawc. & Rendle in *Journ. Bot. lvii.* 66 (1919); pedicels 3–5 mm. l.; sepals of male flower 2 mm. l., of female nearly 3 mm. l.; stamens less than half as long as sepals; filaments united nearly to apex, column about ·5 mm. l.; anther-cells separate; ovary one-third the length of sepals; styles united, ·5 mm. l., column erect, one-half as long as the ovary, branches 3, short, broad, spreading, divided below the middle into two or three linear segments, recurved; disk of male flowers of stalked large flat roundish peltate glands, as long as the staminal column, of female flower saucer-shaped with lobed margin, ·3 mm. l., one-third as long as ovary. Types in Herb. Mus. Brit. and Herb. Jam.

Holly Mount, Mt. Diablo, Harris! Fl. Jam. 8988.

Shrub or tree to 20 ft. high. *Scaly cone* (young) at apex of branches, scales triangular, acute or acuminate, about 3 mm. l. *Penultimate branches* 6–12 cm. l., 1–1·5 mm. br. *Flowering branches* in two vertical rows, lanceolate to narrowly oblong, apex obtuse, 4–5 cm. l.; notches few, 5–8 on each side, above the middle, small or indistinct; striated only by the principal somewhat distant veins. *Pedicels* 1–4 at each notch. *Sepals* of male flower 6, ovate-elliptical, of female flower obovate-oblong or elliptical to roundish.

20. *P. Coxianus* Fawc. & Rendle in *Journ. Bot. lvii.* 66 (1919); pedicels 3–6 mm. l.; sepals 1·4–2·2 mm. l.; stamens half as long as sepals; filaments united above the middle, column 1·6–1 mm. l.; anther-cells united; disk of female flower cup-shaped, about half the length of the ovary; ovary about one-third the length of the sepals; styles united into a short erect column, one-third to one-quarter length of ovary, branches much longer than column, divided halfway into two or three spreading linear segments or main branch again forked.

In a garden, St. Ann, Prior! Ramble, Claremont, 1700 ft., Fawcett & Harris! Fl. Jam. 7025.

Shrub, 10 ft. high. Bark of young shoots light brown, becoming ash-coloured and roughish with conspicuous scars. Scaly cone about twice as broad as the twig; stipules triangular-ovate, blunt; scale-leaves linear-lanceolate, acuminate, both 3–4 mm. l. Penultimate branches 8–17 cm. l., 1–2 mm. br. Flowering branches in two vertical rows, elliptical, narrowing to both ends, with apex generally subacute, or lanceolate or oblanceolate, 6–9 cm. l., 1·5–2 cm. br.; notches 14–7 on each side, mostly above the middle and somewhat dense, sometimes one or two occurring below the middle, distinct; striated only by the principal, somewhat distant, veins. Pedicels 1–4 at each notch. Male flowers: Sepals 6, unequal, elliptical or obovate-elliptical, outer about 1·4 mm. l., inner to 2·2 mm. l. Female flowers: Sepals 6, unequal, outer elliptical about 1·5 mm. l., inner broadly obovate-elliptical or roundish, about 2 mm. l.

This species is named in honour of the late Hon. H. E. Cox, owner of the estate on which it was found.

21. *P. Swartzii* Fawc. & Rendle in *Journ. Bot. lvii.* 67 (1919): pedicels 6–7 mm. l.; calyx obconical, narrowing gradually into the pedicel; sepals 1·7 mm. l.; stamens nearly equalling sepals; filaments long, united almost to apex; anther-cells separate; ovary together with styles nearly equalling sepals; styles united, as long as the ovary, stigmas sessile on the column, 2–3-divided, recurved or spreading; disk of male flowers of flattened roundish peltate glands, of female flower cup-shaped with lobed margin, as long as the ovary.—*P. latifolius* Muell. Arg. in *DC. Prodr. xv.* pt. 2, 431 (1866); *Urb. Symb. Ant. iii.* 291 in *Obs. (non Sw.).* Specimens from Swartz in Herb. Mus. Brit. and Herb. Stockholm.

Sea-coast, Swartz! Lapland, 2000 ft., Harris! Fl. Jam. 9191.

Tree 15 ft. high. Scales at apex of branches ovate, apex blunt or acute, 3–5 mm. l.; stipules at base of flowering branches more or less deciduous, lanceolate or linear; scaly cone two or three times as broad as upper part of branch. Penultimate branches modified, slightly notched, linear, compressed, about 1 dm. l., 1·2–2 mm. br. Flowering branches in two vertical rows, lanceolate, acuminate, 4–6·5 cm. l., 1–1·5 cm. br.; notches distinct, 8–12 on each side, extending below the middle; striated only by the principal somewhat distant veins. Pedicels 1 or 2(–4) at each notch. Flowers red, 2 mm. l. Male flowers: Sepals 6, subequal, elliptical. Disk: glands 6, flattened, roundish, peltate. Filaments 1·7 mm. l. Female flowers: Sepals as in male.

22. *P. linearis* Sw. *Fl. Ind. Occ.* 1113 (1800); flowering branches linear, similar to the penultimate branches and scarcely wider.—*Griseb. loc. cit.*; *Muell. Arg. tom. cit.* 430. *Xylophylla angustifolia*, var. *linearis* Sw. *Prodr.* 28 (1788).

Wright! *Swartz!* *Bertero!* *Macfadyen!* sea coast, Westmoreland, Purdie! Cinnamon Hill, Shore! Lucea, Hitchcock; Mulgrave, St. Elizabeth, 1300 ft.; Eton, Hanover, 100 ft.; *Harris!* *Fl. Jam.* 12,382, 12,871.

Shrub 1-10 ft. high. *Stipules* triangular-ovate, about 1·5 mm. l. *Penultimate branches* 6-8 cm. l., 1·5-2 mm. br. *Flowering branches* in two vertical rows, 3-10 cm. l., 1-3 mm. br.; notches 2-5 on each side, distant, minute; veins dense, straight. *Male flowers*: *Sepals* 6, roundish, white, about 1 mm. l. *Disk* of 6 flat, roundish glands. *Filaments* united below into a very short column, free above. *Anter-cells* united, opening horizontally. *Female flowers*: *Sepals* 6, outer oblong with brownish tips, scarcely 1 mm. l., inner elliptical or ovate, 1·2 mm. l. *Disk* saucer-shaped, splitting irregularly into broad segments, about one-third the length of the ovary. *Styles* flattened, recurved, triangular-ovoblate, truncate, with minute lobes at apex.

The plant commonly grown in gardens under the name *Phyllanthus nivosus* W. G. Smith, and to some extent naturalized, is *Breynia nivea* Small (*Bull. Torr. Bot. Cl.* xxxvii. 516 (1910)), a native of New Hebrides. It is a bushy shrub of loose habit, with dark, wiry branches, and white and green mottled, ovate-elliptical leaves. Flowers monœcious, the male with a short top-shaped calyx, the female with a campanulate calyx which becomes enlarged and spreading in the fruit.

2. SECURINEGA Juss.

Shrubs. Twigs in *S. Acidoton* and some other species spiny at apex. Leaves alternate, entire (small, clustered in *S. Acidoton*), somewhat leathery. Flowers clustered in the axils, monœcious or dicecious, without petals; male small, numerous, subsessile, female fewer or solitary. Male flowers: Sepals 5, imbricate. Lobes of the disk or glands 5, alternate with the stamens. Stamens 5, opposite the sepals. Ovary rudimentary with three style-like branches. Female flowers: Calyx like that of the male. Disk subentire. Ovary 3-celled; styles distinct, recurved, 2-branched; ovules two in each cell. Capsule splitting up into 2-valved cocci. Seeds without a caruncle.

Species about 15, in tropical and sub-tropical regions of the world.

S. Acidoton *Fawc. & Rendle in Journ. Bot.* lvii. 68 (1919).—*S. acidothamnus* *Muell. Arg. in DC. Prodr.* xv. pt. 2, 451 (1866); *Urb. Symb. Ant.* vii. 514, obs. 2. *Acidoton frutescens* &c. *Browne Hist. Jam.* 355. *Adelia Acidoton* *L. Syst. ed.* 10, 1298 & *Amœn.* v. 383, 411 (1760). *Flueggea acidothamnus* *Griseb. in Goett. Nachr.* (1865) 164. (Fig. 86.) Type in *Herb. Linn.*

Green Ebony.

Savannas about New Greenwich, *Browne!* *Wright!* *Swartz!* Health-

shire Hills, near Salt Ponds, *Harris & Britton!* near Albion, St. Thomas; *Harris!* Fl. Jam. 10,513, 10,819, 12,191.—Bahamas, Cuba, St. Thomas, St. Jan, Santa Cruz.

Shrub 6–10 ft., “the whole plant has a good deal of the appearance of a young Ebony” (Browne). *Branches* numerous, the youngest twigs zig-zag and spiny, apex ending in a spine. *Leaves* clustered with the flowers, obovate, papery, network of veins dense and prominent, paler beneath,

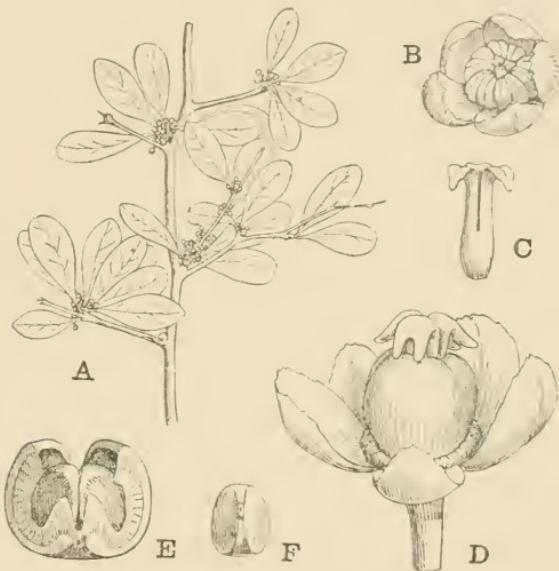


Fig. 86.—*Securinega Acidoton* Fawc. & Rendle.

A, Portion of branch with male flowers in bud $\times \frac{2}{3}$.

D, Female flower $\times 11$.

B, Male flower in bud $\times 11$.

E, Coccus with 2 seeds $\times 4$.

C, Abortive ovary and styles of B $\times 32$.

F, Seed $\times 4$.

•5–1·5 cm. l.; petioles 1–2 mm. l. Pedicels 3–5 mm. l., to 1 cm. in fruit. *Male flowers*: Buds globular. Sepals roundish, smaller than in the female. Styles of the abortive ovary 3, hooked at apex, as long as the stamens. *Female flowers*: Sepals roundish, about 2 mm. l. Styles broad and thick, divided about half-way. Capsule 3-furrowed, 5 mm. in diam. Seeds about 2 mm. l., pale brown.

3. DRYPETES Vahl.

Trees or shrubs. Leaves alternate, leathery, entire, or slightly wavy, with small teeth, or spiny-toothed, somewhat prominently net-veined on both sides. Stipules minute, soon falling. Flowers dioecious, without petals, clustered in the axils, male generally numerous, female fewer. Male flowers: Sepals 4–6, imbricate. Disk thick, flattish-concave, pushing outwards between the filaments, so that the filaments appear to be inserted in notches of the disk. Stamens inserted between the calyx

and the disk, equal in number and opposite to the sepals (in Jamaican species) or about twice as many. Anthers opening inwardly, but outwardly in *D. ilicifolia*. Rudiment of ovary minute or wanting. Female flowers: Calyx like that of the male. Disk saucer-shaped, crenate. Ovary 2- or 1-celled; stigmas, 2 or 1, flattish, somewhat kidney-shaped, sessile or subsessile at apex of ovary; ovules 2 in each cell. Fruit 2- or 1-celled, somewhat fleshy outside at first, then leathery, tomentellous, with a hard brittle endocarp, not splitting open, with two seeds or only one. Seeds without a caruncle.

Species 13, natives of tropical and subtropical regions in Florida, West Indies, Brazil and Africa.

Leaves entire, wavy, or with small teeth.

- | | |
|--|----------------------------|
| Stigma 2. Sepals about 2 mm. l. | 1. <i>D. lateriflora</i> . |
| Stigma 1. Sepals about 1 mm. l. | 2. <i>D. alba</i> . |
| Leaves spiny-toothed 3. <i>D. ilicifolia</i> . | |

1. *D. lateriflora* Kr. & Urb. in *Engl. Jahrb.* xv. 357 (1892); sepals 4-5, greenish-white, elliptical, densely ciliate-pubescent on margins, 2-2.5 mm. l.; stamens longer than sepals; ovary 2-celled; fruit regular in shape, with two stigmas; leaves entire.—*Sarg. Silv. N. Amer.* vii. 27, t. 308; *Small Fl. S. E. U. States*, 693; *Urb. Symb. Ant.* iv. 340. *D. crocea* Poit. in *Mém. Mus. Par.* i. 159, t. 8 (1815); *Griseb. Fl. Br. W. Ind.* 32;

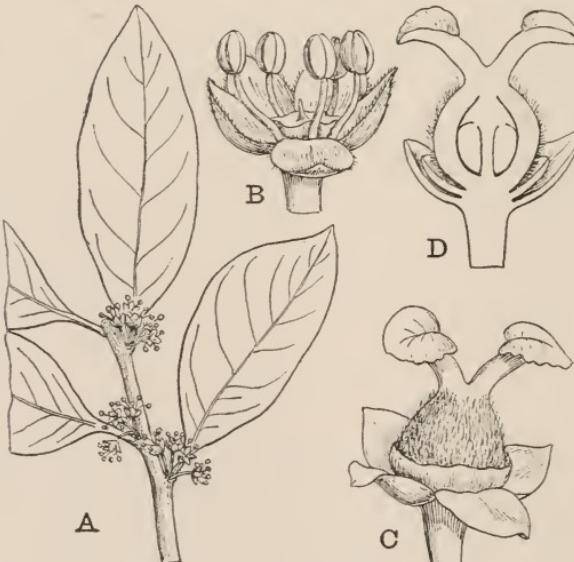


Fig. 87.—*Drypetes lateriflora* Kr. & Urb.

A, Portion of flowering branch $\times \frac{1}{2}$.
B, Male flower $\times 5$.

C, Female flower $\times 5$.
D, Ditto cut lengthwise $\times 5$.

Muell. Arg. in DC. Prodr. xv. pt. 2, 455 (with var.). *Schaefferia lateriflora Sw. Prodr.* 38 (1788) & *Fl. Ind. Occ.* 329. (Fig. 87.) Specimens of both sexes, collected by Swartz in San Domingo, in Herb. Mus. Brit.

White Wood, Guiana Plum.

Wright! Macfadyen! March! Ferry, near Spanish Town, *Grabham!* Green Valley and Berwick, Blue Mts.; Ferry; near Troy, 2300 ft.; Great Goat Is.; *Harris!* Fl. Jam. 5190, 5252, 5316, 7355, 8154, 8709, 9331, 9481.—Florida and Keys, Bahama-, Cuba, Hispaniola, Porto Rico.

Tree 20-40 ft. high, or *shrub* 15 ft. high. *Leaves* oblong or elliptical, apex acute or subacute, base obtuse, sometimes oblique, 6-11 cm. l.; petiole 4-8 mm. l. *Pedicels* 2-4 mm. l. *Male flowers:* Disk tomentellous. *Stamens* 3-5, sometimes two or three times as long as sepals; anthers with connective narrowly winged between the cells. *Ovary* tomentose. *Stigmas* flattish, somewhat kidney-shaped on two short styles. *Fruit* yellow, orange-scarlet, or brown, ovoid-globular, nearly 1 cm. l. *Seed* solitary, flattened-ellipsoidal, 5-7 mm. l.

The wood of this species is heavy, hard, brittle and close-grained, of a rich, dark brown colour, with thick yellow sapwood; a cubic foot of dry wood weighs about 57 lbs (Sargent).

Urban (tom. cit. 356) cites *D. glauca* Vahl from Jamaica, quoting a specimen from March. There is in Herb. Kew. a specimen from March from Jamaica, named by Grisebach *D. glauca* Vahl, but it is *D. lateriflora* Kr. & Urb.

2. *D. alba* Poit. in *Mém. Mus. Par.* i. 157, t. 7 (1815); sepals 4-6, male oblong-ovate or elliptical, 1-1·3 mm. l.; stamens much longer than the sepals; ovary 1-celled; fruit incurved, with one stigma below the apex; leaves entire or slightly wavy with small teeth.—*Muell. Arg. in DC. Prodr. xv. pt. 2, 455* (with vars.); *Urb. in Engl. Jahrb. xv. 355 & Symb. Ant. iv. 340.* *D. glauca* Griseb. Cat. Cub. 15 (1866) (non Vahl). *D. incurva* Muell. Arg. in *Linnæa xxxii. 82* (1863). *Liparene alba* Poit. MS. ex Baill. *Étud. Euphorb.* 608 (1858). Specimen from Poiteau in Herb. Mus. Brit.

Macfadyen! Knockalva, 800 ft., *Harris!* Fl. Jam. 7098.—Cuba, La Tortue, Hispaniola, Porto Rico, Guadeloupe.

Tree 15-60 ft. high. *Leaves* lanceolate to oblong-ovate and ovate, shortly acuminate, apex obtuse, base wedge-shaped, sides often unequal and base oblique, 5-12 cm. l.; petiole 6-8 mm. l. *Pedicels:* of the male numerous, nearly twice as long as the calyx; of the female 5-12, in flower as the male, in fruit shorter or longer than the fruit. *Male flowers:* *Stamens* 3-6. *Female flowers:* *Sepals* 4-6, triangular, about 1 mm. l. *Ovary* tomentose. *Fruit* white, obliquely ellipsoidal, narrowing to the stalk to 1·3 cm. l.

3. *D. ilicifolia* Kr. & Urb. in *Engl. Jahrb. xx. 352* (1892); male sepals 4 or 5, outer roundish, inner narrower, ovate, shortly puberulous outside, tomentellous inside, 2·5-3 mm. l.; stamens not longer than calyx; ovary 1-celled; fruit subregular, with 1 stigma; leaves toothed, with a spine from each tooth.—*Urb. Symb. Ant. iv. 340 & vi. 89.* *Agrifolium folio* &c. *Sloane Cat.*

173 & *Hist. ii.* 108, *t.* 188, *f.* 2. *Malpighia aquifolia L.* *Amar.* *v.* 379 (1759) & *Herb. non Sp. Pl.* 426 (1753). *Frutex Ilicis &c.* *Browne Hist. Jam.* 372. *Malpighia foliis lanceolatis &c. Plum.* *Pl. Amer. (Burm.)* 160, *t.* 167, *f.* 2.

Rose Wood.

Don Christopher's Cove, *Sloane Herb.* vii. 40! St. James, *Browne!* Grandvale, Westmoreland, *Harris!* *Fl. Jam.* 7089.

Shrub 6-10 ft. high, or *tree* 30 ft. high. *Branches* with pale grey bark covered with numerous roundish lenticels. *Leaves* ovate to oblong-elliptical, apex narrowed, acute, ending in a short spine, base slightly unequal, obtuse or acute, margin with large teeth (3-4 mm. l.) ending in a spine (2-4 mm. l.), somewhat leathery, 7-15 cm. l., 2 5-7 cm. br.; petioles 4-7 mm. l. *Pedicels* 1·5-2·5 mm. l., in fruit to 4 mm. l. *Male flowers* greenish, 4-10 in a cluster. *Stamens* 7-10; filaments scarcely 1 mm. l.; anthers opening outwardly. *Female flowers* not seen. *Fruit* 1-celled, somewhat obliquely ellipsoidal, narrowing to base, apex rounded, tomentellous, 1·5-2 cm. l.; stigma sessile. *Seed* solitary.

4. HYERONIMA Allem.

Trees scaly, sometimes with brownish hairs. Leaves alternate, large, entire; stipules usually small. Flowers small, diœcious, without petals, in axillary panicles. Male flowers: Calyx campanulate, 3-6-toothed. Disk cup-shaped, outside the stamens. Stamens 2-5, opposite the teeth of the calyx. Rudiment of ovary small. Female flowers: Calyx and disk like those of the male. Ovary 2-celled; styles 2-3, very short, 2-cleft, spreading; ovules 2 in each cell. Fruit small, slightly fleshy with hard brittle endocarp, 2-celled with 1 cell empty. Seed generally solitary, without a caruncle.

Species 13, natives of tropical America (including West Indies).

H. clusioides Muell. *Arg. in Linnæa xxxiv.* 66 (1865) & in *DC. Prodr. xv. pt. 2,* 272; *Urb. Symb. Ant. iv.* 341. *H. alchorneoides* Griseb. *Fl. Br. W. Ind.* 32 (1859) (non *Allem.*). *Stilaginella clusioides* Tul. in *Ann. Sc. Nat. sér. 3, xv.* 245 (1851). (Fig. 88.)

Wilson! near Moneague, *Prior!* Tweedside, north St. Andrew, 3000 ft., *Harris!* John Crow (Blake) Mts., *Harris & Britton!* *Fl. Jam.* 5814, 10,733.—Porto Rico, Dominica, St. Vincent, Grenada, Trinidad.

Tree to 60 ft. high. *Leaves* with numerous scales on both surfaces, elliptical, apex obtuse or acute, sometimes apiculate; nerves and veins slightly prominent on the upper surface, midrib and nerves prominent and hairy beneath, veins usually not evident, 9-16 (7-20) cm. l.; stipules small, scale-like, about 1 mm. l., petioles 5·5-2 cm. l. *Panicle* covered with scales, lax-flowered in male, about 8 cm. l. *Male flowers* green. *Pedicel* about as long as the calyx, very scaly. *Calyx* about 7 mm. l., minutely 3-5-toothed, scaly-tomentellous outside. *Disk* about half as long as the calyx, the margin with minute teeth and densely puberulous. *Female flowers:* *Calyx* about 8 mm. l., increasing to 1·3 mm. in fruit, minutely toothed or wavy, scaly-tomentellous. *Disk* 4 mm. l., margin

fringed. Ovary ovoid-cylindrical, glabrous. Fruit globular, apiculate, with persistent styles, 2 mm. l., nearly the same in diam.

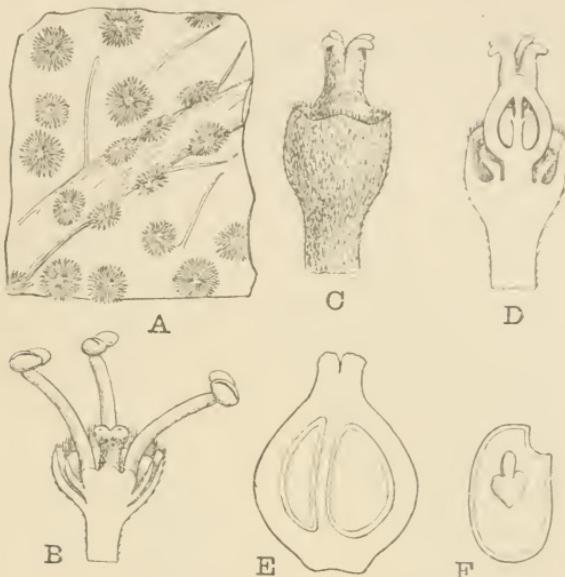


Fig. 88.—*Hyeronima clusioides* Muell. Arg.

A, Portion of leaf showing on the under side a nerve, hairs, and scale-hairs $\times 33$.
B, Male flower cut lengthwise $\times 11$.
C, Female flower $\times 11$.

D, Ditto cut lengthwise $\times 11$.
E, Fruit cut lengthwise $\times 11$.
F, Seed of *H. alchorneoides* cut lengthwise, enlarged. After Tulasne in Fl. Bras.

5. SAVIA Willd.

Shrubs or small trees. Leaves alternate, entire, stiffly membranous or leathery. Flowers dioecious, with rudimentary petals, axillary, male densely clustered, subsessile, female solitary or few, with short or long pedicels. Male flowers: Sepals 5, subequal, imbricate. Petals small, sublinear. Disk ring-like, outside the stamens in the male flower. Stamens 5, opposite the sepals; filaments free; anther-cells close together, opening longitudinally. Ovary rudimentary, with 3 short styles. Female flowers: Sepals and petals like those of the male. Disk ring-like. Ovary 3-celled; styles separate, spreading above, with two awl-shaped acuminate branches; ovules 2 in each cell. Capsule breaking up into 2-valved cocci. Seeds ovoid or 3-edged; without a caruncle.

Species about 10, West Indies.

Leaves elliptical to ovate-lanceolate, acuminate 1. *S. sessiliiflora*.
Leaves obovate-elliptical, with rounded apex 2. *S. erythroxyloides*.

1. *S. sessiliflora* Willd. *Sp. Pl.* iv. 771 (1806); leaves elliptical to ovate-lanceolate, usually acuminate, stiffly membranous, on the midrib especially at the base and the petioles densely hirsuto-pubescent, otherwise glabrous.—*Muell. Arg. in DC. Prod.* xv. pt. 2, 231; *Urb. Symb. Ant.* iv. 337, vi. 90. *Croton sessiliflorus* Sw. *Prodri.* 100 (1788) & *Fl. Ind. Occ.* 1179. *Phyllanthus laurifolius* A. Rich. in *Sagra Cub.* xi. 216, t. 70 (1850). *P. pubigerus* A. Rich. loc. cit. (Fig. 89.)

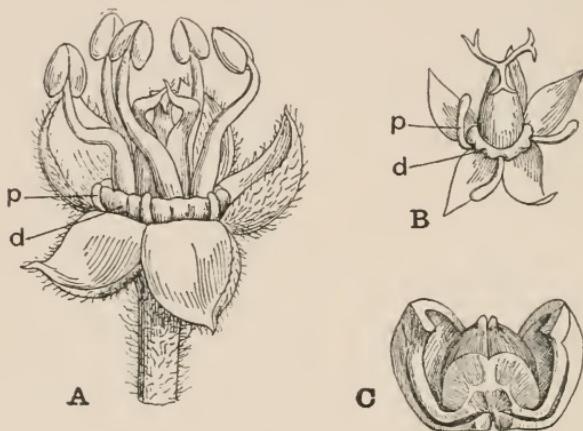


Fig. 89.—*Savia sessiliflora* Willd.

A, Male flower; p, petal; d, disk $\times 11$.
B, Female flower; p, petal; d, disk, enlarged. After Jussieu.
C, Coccus with 2 seeds $\times 3$.

Swartz.—Cuba, Hispaniola, Porto Rico, St. Thomas, St. Cruz, St. Jan. Shrub or tree 12-24 ft. high. Young twigs hirsuto-pubescent. Leaves 4-8 cm. l. Stipules triangular, acuminate, soon falling, 1.5 mm. l. Sepals pubescent. Petals of both sexes 3-5, sublinear or partly rudimentary, or wanting sometimes in female flowers. Male flowers about 2 mm. l. Stamens 3 mm. l. Female flowers: Ovary glabrous. Capsule glabrous, 8-10 mm. in diam. Seeds solitary, 5 mm. l., broadly ellipsoidal.

We have not seen a specimen from Jamaica. The species is included on the authority of Mueller, who states that he saw in Herb. DC. a specimen collected in Jamaica by Swartz.

2. *S. erythroxyloides* Griseb. in *Mem. Am. Acad. n.s. viii.* 157 (1860); leaves obovate-elliptical, with apex usually rounded, narrowed to the base, leathery, glabrous.—*Muell. Arg. tom. cit.* 230.

Albion Mt., St. Thomas in the East, *Harris! Fl. Jam.* 11,683, 12,196, 12,198.

Shrub or small tree, 6-20 ft. high. Leaves 2-6 cm. l., somewhat prominently net-veined, especially on the upper surface; petioles 3-5 mm. l. Capsule tomentellous in young state, glabrous when ripe, globular, somewhat flattened at top and bottom, reddish-brown tomentellous when young, glabrous mature, about 8 mm. in diam. Seeds 3-angled, brown, 4-5 mm. l.

6. PICRODENDRON Planch.

Small trees. Leaves deciduous, alternate, digitately 3-foliolate. Stipules small, inconspicuous, soon falling. Flowers diœcious, without petals. Male flowers: Calyx wanting. Stamens in clusters of 3–54 on a convex receptacle which may be formed of the union of the bases of the filaments, subtended by one or more(–7) imbricate bracts; clusters on peduncled axillary spikes crowded at the ends of young twigs and appearing with the young leaves. Filaments short. Anthers 2-celled, basifix, dehiscing longitudinally; pollen minutely muriculate. Rudiment of ovary wanting. Female flowers stalked, solitary, axillary. Pedicel expanded at the apex into a concave receptacle. Calyx of 4–5 unequal valvate free sepals, bearing minute glands at the base. Staminodes absent. Ovary superior, 2-celled, outer wall containing numerous vesicles. Style terminal, slender, bearing two large spreading stigmas. Ovules two in each cell, pendulous from the apex of the central axis, anatropous, raphe ventral, integuments two; a reddish-brown cushion-like outgrowth (*obturator*) springing from the placenta just above the insertion of the pair of ovules and closely roofing over the two micropyles. The obturator does not develop with the growth of the seed, but becomes withered. Fruit a drupe, the thin fleshy exocarp full of vesicles containing a very bitter juice, the woody brittle endocarp marked with four equidistant longitudinal lines containing generally one, occasionally two seeds, one in each cell. Seed pendulous from the top of the cell, without endosperm. Testa membranous infolded between the folds of the cotyledons. Radicle superior.

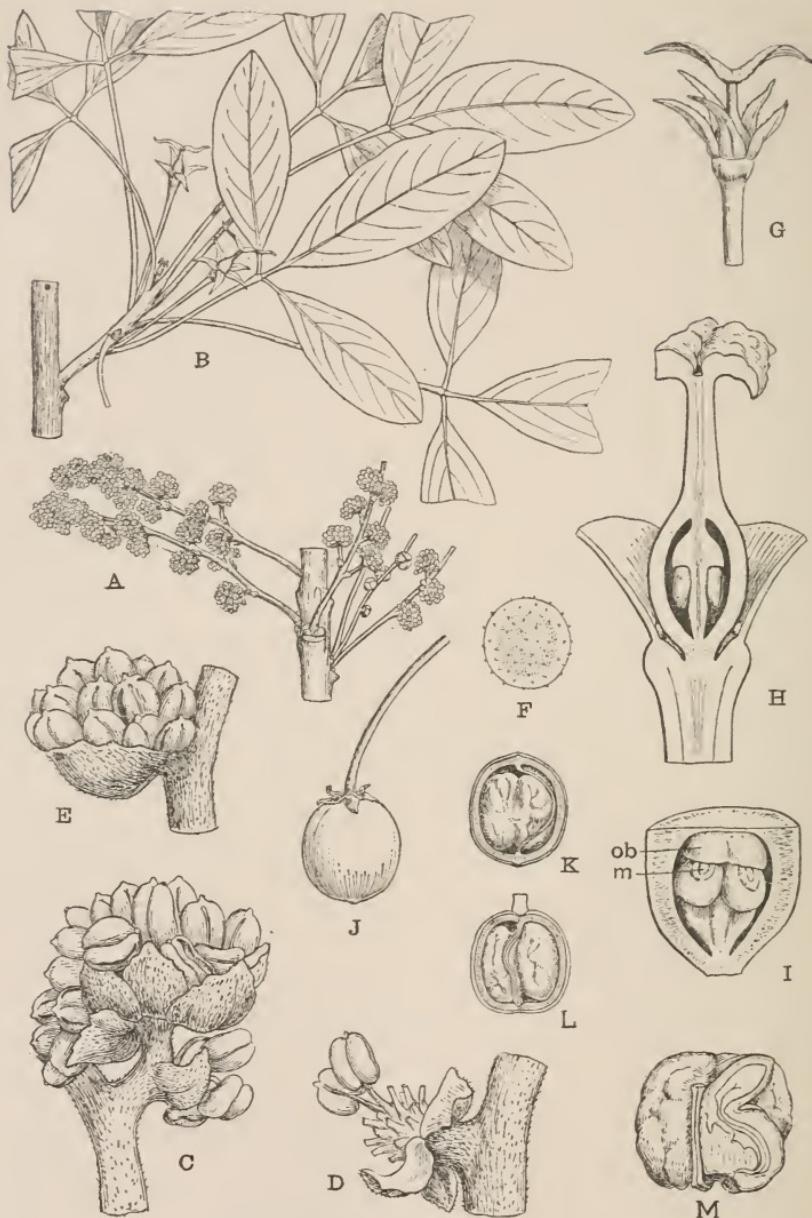
Species 3, one a native of Jamaica, a second of the Bahamas and Cuba, and a third of San Domingo.

P. baccatum Kr. & Urb. in *Engl. Jahrb.* xv. 308 (1892); *Small* in *Journ. N. York Bot. Gard.* xviii. 180; *Fawc. & Rendle* in *Journ. Bot. lv.* 268. *P. arboreum* *Planch.* in *Hook. Journ. Bot.* v. 580 (1846). *P. juglans* *Griseb. Fl. Br. W. Ind.* 177 (1859). *Nux juglans trifolia* &c. *Sloane Cat.* 128 & *Hist. ii.* 1, t. 157, f. 1. *Juglans foliis oblongis* &c. *Browne Hist. Jam.* 346. *Juglans baccata* *L. Syst. ed. 10,* 1272 (1759) & *Sp. Pl. ed. 2,* 1416 (1763). *Rhus arborea* *Macf. Jam. i.* 225 (1837) (excl. syn.) (non *DC.*) (Fig. 90.)

Jamaica Walnut.

St. Jago de la Vega savanna; banks of Rio Cobre; *Sloane Herb.* v. 49! Ferry, *Browne*; "Falls on the Windward road; near Hanson's Salt Pond"; *Macfadyen!* *March!* Ferry Pen, *Campbell!* Ferry River; Great Goat Is.; *Harris!* *Fl. Jam.* 6277, 6293, 6436, 9046, 9313.

Tree 25–40 ft. Leaflets elliptical to lanceolate, 4–11 cm. l.; veins

Fig. 90.—*Picrodendron baccatum* Kr. & Urb.

A, Part of a twig with male inflorescence $\times \frac{2}{3}$.

B, Ditto female inflorescence $\times \frac{2}{3}$.

C, D, Clusters of stamens with subtending bracts $\times 7$.

E, A grain of pollen $\times 400$.

F, Female flower $\times 2$.

G, Female flower $\times 2$.

H, Ovary and style cut lengthwise, showing the two cells $\times 5$.

I, Ovary cut lengthwise through one cell $\times 10$; ob, obturator; m, micropyle.

J, Fruit $\times \frac{2}{3}$.

K, Ditto cut open with one seed $\times \frac{2}{3}$.

L, Ditto cut open with two seeds $\times \frac{2}{3}$.

M, Seed cut to show radicle and cotyledons $\times 1\frac{1}{2}$.

reticulate with fine meshes. *Male flowers*: Bracts 1·2-1·5 mm. l.; anthers about 1 mm. l.; filaments shorter. *Female flowers*: Sepals 4 or 5, valvate, more or less unequal, slightly toothed, 3-5(-8) mm. l., linear-lanceolate. Style columnar. Drupe orange-yellow, about 2 cm. in diam., indehiscent. Seed: raphé within the furrow of the seed passing out anteriorly into a linear black chalaza, and terminating between the lower lobes of the seed; edible, but should be eaten with caution.

7. CROTON L.*

Trees or shrubs usually more or less covered with brownish or whitish stellate hairs or with scales. Leaves usually alternate, sometimes with 2(-several) glands at the apex of the petiole above, or at base of midrib beneath, or at base of limb beneath, entire, or serrate, sometimes ciliate with glands. Flowers monococious or rarely diœcious (in *C. linearis* and *C. discolor*), with petals in male flowers, and in female flowers of *C. glabellus* (rudimentary or wanting in other Jamaican species), spicate or subracemose at the apex of branches, or sometimes axillary as well as terminal, the male along the upper part of the rhachis, the female on the lower part, solitary under each bract, or sometimes one with two or three male under each bract below. Male flowers: Receptacle generally hairy. Calyx of 5 (4, 6) segments, equal in Jamaican species, valvate or narrowly imbricate. Petals 5 (4). Disk represented by glands. Stamens generally 10-20; filaments bent and anthers pendulous in the bud, both erect in the flower. Rudiment of ovary wanting. Female flowers: Calyx-segments generally equal, but unequal in *C. glandulosus* and *C. hirtus*, sometimes increasing in size after flowering. Disk ring-like or of distinct scales at the base of the calyx. Ovary 3-celled; styles once or twice divided; ovules solitary in the cells. Capsule splitting up into 2-valved cocci. Seeds smooth with a small caruncle.

Species nearly 700, very widely dispersed in the tropics, and a few in America outside the tropics.

Leaves entire or subentire.

Margin not ciliate with glands.

Glands at base of leaf or apex of petiole.

Diœcious; leaves 2-5 cm. l.; glands at apex of petiole above.

Leaves linear-oblong; nerves not obvious beneath

1. *C. linearis*.

Leaves oblong to roundish-elliptical; nerves prominent beneath

2. *C. discolor*.

* The ornamental garden "Crotons" do not belong to this genus, but to *Codirum*, especially to *Codirum variegatum*. The species are natives of the islands in the southern Pacific and the Malay Archipelago.

- Monœcious; leaves 2–10 cm. l.; glands at base of leaf.
- Leaves 2·5–6 cm. l., narrowly lanceolate or linear-oblong.....
 - Leaves 2–10 cm. l., ovate-lanceolate to ovate
- Glands wanting at base of leaf and on petiole.
- Leaves 3–5 cm. l. densely silvery tomentose beneath, mixed with scales
 - Leaves pubescent with stellate hairs, or glabrous beneath.
- Female calyx convex, with edges not folded back.
- Leaves to 3·5 cm. l., oval-elliptical to oblong-elliptical
 - Leaves 4–10 cm. l., lanceolate-elliptical to oblong-elliptical
- Female calyx angular, with base of segments folded back outwards.
- Leaves 7–18 cm. l., broadly elliptical to oblong-elliptical
 - Leaves with silvery scales beneath
 - Margin ciliate with glands.....
- Leaves serrate or serrulate.
- Stipulate; glands at base of leaf or apex of petiole (sometimes wanting in *C. populifolius*).
- Racemes 1–2 dm. l.
 - Leaves with numerous stellate hairs
 - Leaves with few stellate hairs.
 - Stipules 5–10 mm. l., cut into linear gland-tipped segments.....
 - Stipules small, inconspicuous
- Racemes to 3 cm. l., flowers crowded.
- Glands at base of leaf saucer-shaped
 - Glands long-stalked, 1·5–2 mm. l.
- Stipules and glands wanting. Racemes 2–4 cm. l.
1. *C. linearis* Jacq. *Sel. Stirp. Amer.* 256, *t.* 162, *f.* 4 & *Ed. pict.* 124, *t.* 263, *f.* 80; dicecious; leaves 5·5–2·2 cm. l., 1·5 mm.–1·5 cm. br., linear-oblong, usually obtuse at both ends, margin entire, upper surface glabrous, often roughish with minute points, beneath densely covered with yellowish tomentum of flat stellate hairs; usually with two or three cylindrical glands at apex of petiole on upper surface (often others minute); nerves pinnate, usually slightly prominent but indistinct on upper surface, not obvious beneath.—*Geisel. Crot. Monog.* 6; *Bennett in Journ. Proc. Linn. Soc.* iv. 30; *Daniell in Journ. Pharm. Soc.* iv. 229, with tab., figs. 2, 3, 7; *Muell. Arg. in DC. Prodr.* xv. pt. 2, 615. *C. linearis* var. *dilatatus* *Urb. Symb. Ant.* v. 385 (1907). *Croton fruticulosum* *foliis longis &c.* *Browne Hist. Jam.* 347. *C. Cascaria L. Sp. Pl. ed. 2*, 1424 (1763) (excl. *Catesb. Car.* & *Herb.*; *Woodr. Med. Bot. ed. 3*, 629, *t.* 222; *Geisel. Crot.*
 3. *C. Priorianus*.
 4. *C. flavens*.
 5. *C. micans*.
 6. *C. ovalifolius*.
 7. *C. lucidus*.
 8. *C. laurinus*.
 9. *C. glabellus*.
 10. *C. humilis*.

Monog. 8. C. Cascarilla var. linearis Griseb. *Fl. Brit. W. Ind.* 38. Ricino affinis odorifera fruticosa major &c. *Sloane Cat.* 44 & *Hist. i.* 133, *t.* 86, *f.* 1. Clutia Cascarilla L. *Syst. ed.* 10, 1299 (1759) & *Amoen. v.* 411, 383 (non *Sp. Pl.*) & *Herb.* (Fig. 91.)

Wild Rosemary or Spanish Rosemary.

Near Passage Fort; Red Hills; *Sloane Herb.* ii. 91! *Houstoun!* *Lane* in *Herb. Sloane clxii.* 127! *Wright!* *Broughton!* *von Rohr!* *Macfadyen!* *McNab!* *Liguanea plain;* near Port Antonio; *Purdie!* *Wilson!* *Kingston;* "near Mr. Fyne's coffee region of Blue Mts.;" *Prior!* *March!* rocky sea-coast, Low Layton, *Metcalf!* near Port Antonio, *Millspaugh;* J.P. 700, *Jenman!* *Hope,* J.P. 1005, *Hart!* *Watson Hill,* *Fawcett!* near Kingston, *Campbell!* near Alligator Pond, 500 ft.; Grove, near Hope, 700 ft.; near Falmouth; Great Goat Is.; Healthshire Hills; Long Mountain, 30 ft.;

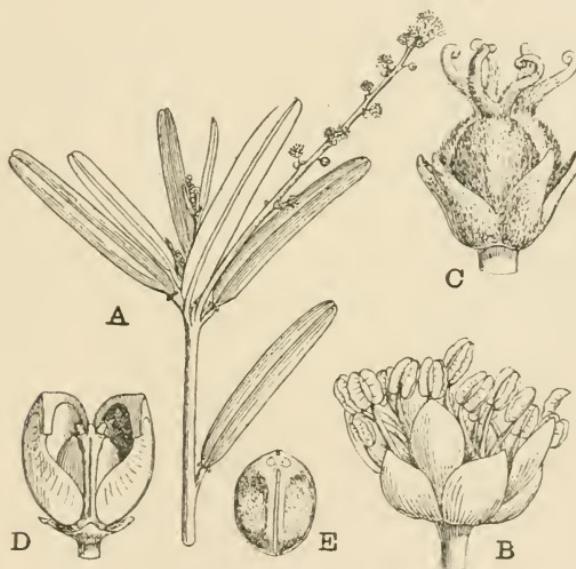


Fig. 91.—*Croton linearis* Jacq.

A, Portion of branch with male inflorescence $\times \frac{2}{3}$.

B, Male flower $\times 7.$

C, Female flower $\times 10.$

D, Coccus with seed $\times 3.$

E, Seed $\times 4.$

Cane R. valley, 350 ft.; Pedro Bluff; *Harris!* *Fl. Jam.* 5724, 6323, 6557, 7235, 9338, 9527, 9580, 9623, 9733.—Florida, Bahamas, Cayman Is., Cuba, Hispaniola.

Shrub 3-9 ft. high, much branched, aromatic; young twigs, inflorescence and calyx tomentellous with yellow (or whitish) flat stellate hairs; diœcious. Leaves 5·5-2·2 cm. l., 1·5 mm.-1·5 cm. br., linear-oblong, usually obtuse at both ends, margin entire, upper surface glabrous, beneath covered densely with yellowish tomentum of stellate hairs, usually with two or three cylindrical glands at apex of petiole (often others minute) on upper surface, somewhat leathery; nerves pinnate, usually slightly prominent but indistinct on upper surface, not obvious beneath; petiole 2-6 mm. l. Racemes usually somewhat longer than the leaf. Flowers shortly stalked or subsessile, female usually sessile. Male flowers: Calyx 1·5 mm. l.

Petals oblanceolate, 2 mm. l., pubescent at base. *Stamens* 13–15, longer than the petals, filaments glabrous. *Female flowers*: *Calyx* 1·8 mm. l., segments triangular-lanceolate. *Ovary* hirtellous. *Styles* 2-parted; branches undivided, thick below, apex hooked. *Capsule* 5 mm. l. *Seeds* 2·5 mm. l., 2 mm. br.

C. Cascarilla Bennett, a distinct species, has lanceolate leaves, acute at both ends, usually with two glands at base of leaf beneath. It is a native of New Providence, Bahamas; the type is in Herb. Mus. Brit. Mills-paugh (Field Col. Mus. Bot. ii. 307) errs in including this species under *C. linearis*.

2. *C. discolor Willd. Sp. Pl. iv. 532 (1805)*; dioecious; leaves 2–4 cm. l., 1–2·5 cm. br., oblong-elliptical, oblong-ovate, oval-elliptical, or roundish-elliptical, apex and base rounded or obtuse, mucronulate, subentire, with two or three cylindrical glands (sometimes others minute) at apex of petiole on upper surface, glabrous above, densely whitish- or yellowish-tomentose beneath with flat stellate hairs; nerves pinnate, impressed on upper surface, prominent beneath.—*Geisel. op. cit. 18*; *Muell. Arg. tom. cit. 615*; *Urb. Symb. Ant. iv. 343*.

Near Port Antonio, Purdie! March! Orange Bay Point, Hanover, Harris! Fl. Jam, 10,261.—Bahamas, Hispaniola, Porto Rico, St. Thomas, St. Cruz.

Shrub to 5 ft. high. Young twigs, petioles, and inflorescence tomentellous with flat yellowish stellate hairs. Leaves somewhat leathery; petiole 5–8(–15) mm. l. Racemes of male plants as long as the leaves to three times as long; clusters of flowers crowded or distant. Pedicels short, to 2 mm. l. Male flowers: Calyx about 2·5 mm. l., 5-parted; segments ovate, with five free sessile twin glands on receptacle at base. Petals 3 mm. l., oblong-oblanceolate, pubescent near base. Stamens 15 or 16; filaments glabrous. Female flowers: Calyx one-third longer than the ovary; segments lanceolate, acuminate. Ovary densely hirtellous with stellate hairs. Styles 2-parted; branches tightly involute, hirtellous.

3. *C. Priorianus Urb. Symb. Ant. iii. 295 (1902)*; monoecious; leaves 6–2·5 cm. l., 1·5–1·7 cm. br., narrowly lanceolate or oblong-linear, gradually narrowed towards the apex, apex obtuse or rounded and very shortly apiculate, base rounded or subcordate, margin entire, upper surface roughish with very small stellate hairs, beneath with yellow or whitish tomentum of stellate hairs; with two or more glands at base above and beneath; nerves slightly impressed.—*C. Cascarilla a. Griseb. op. cit. 38 (1859)*.

Prior; March!

Young twigs densely yellow-tomentellous with stellate hairs. Leaves alternate or at the apex opposite or three in a whorl, subleathery; petiole 4–15 mm. l.; stipules wanting. Racemes 2–10 cm. l., tomentellous; peduncle 1–2 cm. l. Male flowers: Sepals 1·5–1·7 mm. l. Petals obovate-lanceolate, a little longer than the sepals, pubescent on the lower margin. Disk-glands transversely oblong-elliptical. Stamens about 16. Female flowers subsessile: Sepals 2 mm. l., lanceolate. Petals very minute, gland-like. Disk-glands transversely rectangular-elliptical. Ovary globular, tomentose. Styles 2-parted almost to the base, branches undivided. Capsule (not ripe) globular, 4–5 mm. in diam.

4. *C. flavens* L. *Syst. ed.* 10, 1276 (1759) & *Amoen. v.* 410, 383; leaves 2–10 cm. l., ovate-lanceolate to ovate, tapering to an acute mucronate apex, base cordate or obtuse, on both sides tomentellous with stellate hairs to sparingly stellate-hairy or even glabrous, entire or rarely serrate, with several minute glands often at apex of petiole or base of midrib above, and one cylindrical gland at each side of base of midrib beneath.—*Geisel. op. cit.* 19; *Griseb. op. cit.* 38; *Muell. Arg. tom. cit.* 612. *C. balsamifer Jacq. Sel. Stirp. Amer.* 255, t. 162, f. 3 (1763) & *Hort. Viudob. iii.* 26, t. 46; *L. Mant.* 125; *Geisel. op. cit.* 11; *Griseb. loc. cit.* *C. flocculosus Geisel. op. cit.* 14 (1807); *Griseb. loc. cit.* *C. fruticulosum et villosum &c. Browne Hist. Jam.* 347. Type, Browne's specimen, in Herb. Linn.

Yellow Balsam.

Sloane Herb. v. 108! *Houstoun!* *Lane* in *Herb. Sloane clxii.* 127! *Browne!* *Wright!* near Bull Bay, *Broughton!* *McNab!* Liguanea plain, *Purdie!* *March!* Rock Fort, *Campbell!* Long Mt., 30–200 ft.; *Harris!* *Fl. Jam.* 6254, 8926, 9586.—West Indies, Yucatan.

Shrub 2–10 ft. high, aromatic. Leaves: nerves pinnate; petiole less than half as long as the limb. Flowers pale yellow or white, shortly pedicelled (1–3 mm. l.). Male flowers: Calyx stellate-tomentellous outside, about 2 mm. l.; segments narrowly ovate. Petals oblanceolate, a little longer than the calyx, hairy at lower margin. Stamens 12–16. Female flowers: Calyx like the male, but more pointed. Petals minute, thread-like, gland-like at apex. Ovary tomentellous with yellow stellate hair. Styles 2-cleft. Capsule subglobular, about 5 mm. l. Seeds ellipsoidal, 3–3·5 mm. l., dark grey.

5. *C. micans Sw. Fl. Ind. Occ.* 1185 (1800) (excl. syn.); leaves 3–5 cm. l., ovate-lanceolate, acuminate, base obtuse or slightly cordate, upper surface with a few hairs on the nerves, also sometimes a few stellate scale-like hairs often bearing in the centre a long hair, beneath densely tomentose, with short white stellate hairs and scales, without glands at base; stipules awl-shaped, 2–3 mm. l.; calyx of female flowers densely scaly, segments ovate-triangular, with edges near base slightly folded back outwards.—*Muell. Arg. tom. cit.* 554 (with vars.) & in *Fl. Bras. xi. pt. 2.* 121. *C. nervosus* var. *villosus Klotzsch* in *Hook. Lond. Journ. Bot. ii.* 50 (1843). *C. niveus Griseb. op. cit.* 40 (1859) (non *Jacq.*).

Swartz.—Northern tropical S. America. A specimen from Jamaica, without collector's name, in *Herb. Edinb.* is named by Grisebach *C. niveus*.

Shrub with twigs, petioles, stipules, and young leaves covered with long soft spreading yellowish-brown hairs. Leaves ovate-lanceolate, acuminate, base obtuse or slightly cordate, nerves pinnate, without glands at base, with a few hairs on the nerves on the upper surface, also sometimes a few scattered stellate scale-like hairs often bearing in the centre a long hair, beneath densely tomentose with short white hairs and scales, 3–5 cm. l.; petiole 3–8 mm. l.; stipules awl-shaped, 2–3 mm. l. Racemes with 1–3 female flowers at base succeeded by several male flowers above. Pedicels

1-2 mm. l. *Bracts* thread-like about 1.5 mm. l. *Male flowers* (just opening): *Calyx* densely tomentose inside and outside with stellate hairs, 5-parted, segments elliptical, 1.5 mm. l. *Petals* about 2 mm. l., white, oblong, densely covered inside and on margins with long white hairs, puberulous outside except at apex. *Stamens* 10-14; filaments hairy. *Female flowers*: *Calyx*, covering like that of male, 5-parted, 4 mm. l., segments ovate-triangular, with edges near base slightly folded backwards. *Petals* generally wanting, but sometimes one or more present spatulate, hairy, two-thirds as long as the calyx. *Ovary* densely hairy with scaly hairs with long rays. *Styles* pubescent, 2-parted, branches 2-parted again. *Capsule* somewhat rough with scales more or less persistent, pubescent styles persistent, 6-7 mm. l. *Seeds* ellipsoidal, smooth, brown, 4 mm. l.

6. *C. ovalifolius* Vahl in West Bidr. Ste. Croix (1793): leaves varying much in size, the larger 1.5-3.5 cm. l., oval-elliptical to oblong-elliptical, apex rounded or obtuse, base obtuse to wedge-shaped, entire, upper surface glabrous, beneath more or less hispid with stellate hairs, without glands on margin or at base; stipules linear-acuminate, glandular.—Griseb. op. cit. 41; Muell. Arg. in DC. Prodr. xv. pt. 2, 648. *C. diffusus* Geisel. op. cit. 41 (1807). Specimen from West, St. Cruz, in Herb. Mus. Brit.

Near Kingston, McNab! Prior! March! Windward road, near Kingston; Liguanea Plain; Campbell! Long Mountain, 100 ft.; Harris! Fl. Jam. 6015, 6102, 11,869, 12,119.—Hispaniola, St. Thomas, St. Cruz, Guadeloupe, Venezuela.

Shrub $\frac{1}{2}$ to 1 ft. high, much branched; young twigs pubescent or hispid with stellate hairs, or glabrescent. Leaves varying much in size, the larger 1.5-3.5 cm. l., oval-elliptical to oblong-elliptical, apex rounded or obtuse, base obtuse to wedge-shaped, without glands, upper surface glabrous, beneath more or less hispid with stellate hairs; nerves 3 at base, pinnate above; petiole 1-1.5 cm. l.; stipules linear-lanceolate, with short glandular branches. *Racemes* short, 2-3 cm. l. *Bracts* linear-lanceolate, denticulate. *Male flowers*: *Calyx* 2.5 mm. l.; segments oblong-ovate, pellucid-dotted, puberulous-tufted at apex. *Petals* 2 mm. l., lanceolate, pubescent on lower half inside. *Stamens* about 10; filaments pubescent below. *Female flowers*: *Calyx* 4 mm. l., increasing to 5.5 mm. in fruit, segments linear-lanceolate, fringed with glandular projections. *Ovary* hispid. *Styles* 4-6-parted. *Capsule* 4.5 mm. l., globular, glabrescent, exceeded by the calyx. *Seeds* 3-sided, convex on back, brownish, barely 3 mm. l.

7. *C. lucidus* L. Syst. ed. 10, 1275 (1759) & Amaen v. 410, 383; leaves crowded towards the apex of the branches, so as to appear opposite or ternate, 4-10 cm. l., lanceolate-elliptical, elliptical, or oblong-elliptical, subacute (or rarely roundish), apex obtuse, margin entire or sometimes obtusely and remotely serrate, glabrous or with stellate and simple hairs on both sides, without glands at the base; calyx of female flowers with a few stellate hairs, about three times as long as male; segments oblong, with edges near base folded back outwards.—Sic. Fl. Ind. Occ. 1193; Griseb. (incl. vars.) loc. cit.; Muell. Arg. in DC. Prodr. xv. pt. 2, 561; Urb. Symb. Ant. iv. 341. *Croton erectum* glabrum,

foliis ovatis oppositis vel ternatis, spicis terminalibus *Browne Hist. Jam.* 347. *C. glabellum L. Syst. ed.* 10, 1275 (1759). *C. fruticosum Mill. Gard. Dict. ed.* 8 (1768). *C. pallens Sw. Prodr.* 100 (1788). *C. glanduliferus Vahl in Geisel. Crot. Monog.* 37 (1807). *Mali folio arbor, artemisiae odore flore pentapetalico spicato Sloane Cat.* 139 & *Hist. ii.* 30, *t.* 174, *f.* 1. Type specimen from Browne in Herb. Linn. named by Linnaeus.

Basket Hoop.

Between Town savanna and Two Mile Wood, *Sloane* Herb. v. 111! *Houston!* *Browne!* hills about Bull Bay, *Wright!* *Broughton!* *Shakspear!* *Bertero;* near St. Ann's Bay, *McNab!* also *Purdie!* *March!* *Wilson!* Lucea, *Hitchcock;* Liguanea plain, *Campbell!* Great Goat Is.; Pedro Bluff; Peckham, Clarendon, 2500-2800 ft.; Albion Mt., St. Thomas; *Harris!* near Bull Bay, *Harris & Britton!* Fl. Jam. 6247, 9302, 9727, 10,790, 10,863, 10,966, 11,012, 12,197.—Bahamas, Cuba, Cayman Is., Hispaniola, Porto Rico.

Shrub 2-12 ft. high, or *tree* to 40 ft., aromatic. Young parts of *twigs* and *racemes*, *flowers* sometimes more or less stellate-puberulous, sometimes glabrate or glabrous. *Leaves* pellucid-dotted; nerves and veins more or less indistinct, nerves pinnate and sometimes with two on each side at base; petiole 1-3 cm. l. *Racemes* 3-8 cm. l. *Flowers* white or greenish-white. *Pedicels*, male to 2.5 mm. l., female 2.5-5 mm. l., of fruit 5-8 mm. l. *Male flowers:* *Calyx* about 2 mm. l., 5-parted, densely puberulous on the margins, also more or less on both surfaces; segments oblong-elliptical, base and margins sometimes glandular. *Petals* like the sepals, and as long. *Stamens* 11-12. *Female flowers:* *Calyx* 5-6.5 mm. l., 5-parted, puberulous. *Ovary* sparingly pubescent with stellate hairs. *Styles* short, about 1 mm. l., deeply 4-parted. *Capsule* oblong-ellipsoidal, glabrate, 10-12 mm. l.

The descriptions in English by Sloane of this species and *C. glabellus* in the "History" have been exchanged.

8. *C. laurinus Sw. Prodr.* 100 (1788) & *Fl. Ind. Occ.* 1191 : leaves 7-18 cm. l., broadly elliptical to oblong-elliptical, apex rounded, obtuse or acute, base rounded to wedge-shaped, entire, on both sides with stellate hairs, often glabrate, without glands at base.—*Geisel. op. cit.* 31; *Griseb. op. cit.* 39. *C. laurifolius Muell. in DC. Prodr. xv. pt. 2,* 586 (1866). Type from Swartz in Herb. Stockholm, and a specimen from him in Herb. Mus. Brit.

Swartz! Union Hill, Moneague, *Prior!* near Troy, 2000-2200 ft.; Albion Pen, St. Ann, 2000 ft.; *Harris!* Fl. Jam. 8693, 9410, 12,000, 12,003.

A high shrub with weak straggling branches, or a slender tree, 20-25 ft. high; "fresh juice of branches blood-red" (*Harris*). Stellate hairs on young branches, leaves and petioles, inflorescence, calyx, ovary, capsule. *Leaves* 7-18 cm. l., broadly elliptical to oblong-elliptical, apex rounded, obtuse, or acute, base rounded to wedge-shaped, entire, without glands at base, papery; nerves pinnate; petiole 1-6 cm. l. *Racemes* axillary, usually longer than the leaves, sometimes much longer, 1-3 dm., sometimes with male flowers only. *Bracts* minute. *Male flowers:* *Calyx* about 2 mm. l.; segments triangular, about 1.5 mm. l. *Petals* lanceolate, 2-3 mm. l., apex doubled outwards, pubescent on the margin and with dense short hairs at apex. *Stamens* 5-10, filaments glabrous. *Female flowers:* *Pedicels* thick, about 2 mm. br., about 3 mm. l. *Calyx* 4 mm. l.; segments lanceolate, 3 mm. l. *Petals* minute, linear, gland-tipped, hairy. *Ovary*

hirtellous. Styles cut into 3-6 linear recurved branches down to a broad base. Capsule 1.5 cm. l. Seeds ellipsoidal, smooth, 9 mm. l.

Var. *adenophyllus*, var. nov., differs from the species in the general absence of hairs on the leaf and in the flower, and in being more glandular.—*C. adenophyllus* Spreng. *Syst. iii.* 869 (1826); *Griseb. op. cit.* 40; *Muell. Arg. tom. cit.* 644.

Broughton! Bertero; Mavis Bank, Port Royal Mts., *Harris!* Windward road, 12-16 miles from Kingston, *Fawcett!* near Bull Bay, *Harris & Britton!* Fl. Jam. 5772, 10,791.

9. *C. glabellus* L. *Sp. Pl. ed. 2*, 1425 (1763) (*in part, excl. reference to Amaen. Acad. v. 409*); petals of female flower like those of male; young parts of twigs, leaves, racemes and flowers covered with rusty-grey scales.—*Muell. Arg. tom. cit.* 517. *C. eleutheria* Wright in *Lond. Med. Journ. viii.* 249 (1787) & *Mem. 207*. *C. Eluteria* Sw. *Prodr.* 100 (1788) & *Fl. Ind. Occ.* 1183; *Geisel. op. cit.* 52; *Klotzsch in Hayne Arzneigew.* 14, t. 1; *Griseb. op. cit.* 39 (non *L. Sp. Pl. ed. 2*, 1476). *C. nitens* Sw. *Prod.* 100 (1788) & *Fl. Ind. Occ.* 1189; *Geisel. op. cit.* 48. *C. Sloanei* Bennett in *Journ. Proc. Linn. Soc. iv.* 30 (1859); *Daniell in Pharm. Journ.* 148 with plate. *Clutia Eluteria* L. *Amaen. v. 411*, 383 & *Herb.* (non *Syst. ed. 10*, 1299). *Croton fruticosum* erectum &c. *Browne Hist. Jam.* 347. *Mali folio arbor artemisiae odore et flore Sloane Cat.* 139 & *Hist. ii.* 30, t. 174, f. 2. Specimen of *C. nitens* from Swartz named by him in *Herb. Stockholm*; another specimen in *Herb. Mus. Brit.*

Sloane Herb. v. 109, 110! Wright! *Broughton!* mountains in west, *Swartz!* Macfadyen! *Distin!* Manchester, *Purdie!* *Heward!* *Wilson!* Moneague, *Prior!* *March!* Stoneleigh, *Henderson!* Davids Hill, J.P. 1429; Ferry Pen; Liguanea plain; *Campbell!* Bryans Hill; Berwick; Lapland, 1750 ft.; Long Mountain, 100 ft.; Cane R. valley, 300 ft.; Potsdam, 2600 ft.; Letitz savanna, 300-900 ft.; *Harris!* John Crow (Blake) Mts., 1200 ft., *Harris & Britton!* Fl. Jam. 5115, 5477, 6017, 6264, 9187, 9581, 9628, 9750, 10,708, 11,755.—Bahamas, Mexico, Colombia, Ecuador.

Shrub or tree, 10-30 ft. high, aromatic. Leaves elliptical, oblong-elliptical, or oblong-ovate, entire, very variable in size, 2-15-(20) cm. l., at both ends obtuse, sometimes subacute, base often rounded or subcordate, with a few round whitish scales on the upper side, nearly covered beneath with silvery scales, pinnately nerved, pellucid-dotted, without glands at the base; petiole 2 mm.-2 cm. l. Racemes generally branched, rarely simple, usually only half as long as the leaves, rarely longer than the leaves, 3-12 cm. l., dense-flowered, in axils near apex as well as terminal. Pedicels of male fl. 2 mm. or less, of female 4 or 5 mm., increasing in fruit to 9-14 mm. Flowers white or pale yellow. Male flowers: Calyx 2-2.4 mm. l., 5-parted; segments ovate-triangular, margin colourless, puberulous. Petals slightly longer than calyx, white, puberulous outside and especially dense on margins, oblong. Stamens 10-13; filaments hairy below. Female flowers: Calyx and petals much like the male, but sepals broader, petals lanceolate, both persistent. Ovary scaly, somewhat scurfy. Styles 2-branched, branches again 2-parted once or

twice. *Capsule* obovoid-globose, tuberculate, scaly, scurfy, 7–9 mm. l. *Seed* dark brown, 6 mm. l.

Wright (loc. cit.) considers that "the bark is the same as the cascarilla and eleutheria of the shops."

10. **C. humilis** L. *Syst. ed.* 10, 1276 (1759), *Amaen. v.* 410, 383, & *Sp. Pl. ed.* 2, 1427; leaves 1·5–5·5 cm. l., ovate to ovate-lanceolate, more or less acuminate, base more or less cordate or rounded, margin with distant minute stalked glands, upper side somewhat puberulous, stellate-haired, or glabrescent, beneath white or yellowish-grey with stellate tomentum, without distinctly basal glands; stipules minute, with glandular lobes, or conspicuous, split up into linear glandular lobes.—*Sw. Obs. Bot.* 363; *Geisel. op. cit.* 15; *Griseb. op. cit.* 41 (excl. var.); *Muell. Arg. tom. cit.* 670; *Urb. Symb. Ant. iv.* 343. *C. fruticulosum* minus &c. *Browne Hist. Jam.* 347. *C. salvifolium* Mill. *Dict. ed.* 8 (1768). *C. albidus* Muell. *Arg. tom. cit.* 671 (1866). Type in Herb. Linn. from Browne.

Pepper Rod.

Sloane Herb. ii. 90*! *Houstoun!* *Lane* in *Herb. Sloane clxii.* 126! *Browne!* *Wright!* *Broughton!* *Shakspear!* *Swartz!* *Bancroft!* *Macfadyen!* pastures near the sea, Manchester, *Purdie!* Kingston, *Prior!* *March!* *Liguanea* plain, J.P. 1364, *Morris!* Kingston, *Hitchcock*; also *Clute!* Bethlehem, St. Elizabeth, *T. Harris!* near Alligator Pond, 500 ft.; Long Mt., 30 ft.; Yardley Chase, 1600 ft.; Portland Point and Rocky Point; *Harris!* near Bull Bay, *Harris & Britton!* Fl. Jam. 6266, 8284, 9585, 9676, 10,183, 10,788.—Florida, Bahamas, Hispaniola, Porto Rico, St. Thomas, Mexico, Yucatan.

Shrub 1–5 ft. high, aromatic. Young twigs, inflorescence, calyx whitish or yellowish-grey with stellate tomentum. Leaves pinnate-nerved, with one or two nerves on each side from the base; petiole usually half as long as the leaf. Racemes slender, 3–14 cm. l. Bracts small, ovate, acuminate, more or less cut into gland-bearing segments. Pedicels: male 2–4 mm. l., female 1–2 mm. l. Flowers white. Male flowers: Calyx 2–2·7 mm. l.; segments elliptical. Petals about as long as calyx, elliptical, narrowed to base, pubescent at apex and on margin of lower half. Disk represented by fleshy glands opposite the sepals. Stamens indefinite in number, over twenty. Female flowers: Calyx 4 mm. l., increasing in fruit; segments usually ciliate with stalked glands, oblong, somewhat broader near apex. Petals thread-like, gland-tipped, nearly 2 mm. l. Disk ring-like. Ovary with stellate hairs. Styles 4-parted, thread-like, hairy, involute at apex. Capsule 5–6 mm. l., glabrate, globular-3-lobed. Seeds usually with slight diagonal ridges on back, 3–4 mm. l.

11. **C. corylifolius** Lam. *Encyc. ii.* 205 (1786); one female flower and two or three male flowers in the axil of each lower bract; leaves varying much in size, 3–13 cm. l., broadly ovate, or elliptical to oblong-elliptical or oblong, base subcordate or obtuse, margin irregularly serrate-dentate, sometimes with cylindrical glands, teeth glandular, with two glands at apex of petiole above, youngest leaves covered with stellate hairs, older sparsely covered or glabrescent; stipules linear-acuminate, 5–6 mm. l.,

dark coloured, with a few stellate hairs, soon dropping off.—*Geisel.* op. cit. 29; *Griseb.* op. cit. 39; *Muell. Arg. tom. cit.* 549. *C. montanus* *Geisel.* op. cit. 23.

Pedro savanna, St. Elizabeth, *Purdie!* *Wilson!* Moneague, *Prior!* Falls River, 2000 ft.; Chelsea Hill, St. Cruz Mts., 2200 ft.; Peckham, Clarendon, 2500 ft.; Middlesex, St. Ann, 1600 ft.; *Harris!* Fl. Jam. 5769, 9691, 11,093, 12,033.—Cuba, Hispaniola, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Venezuela.

Shrub or tree, 12–30 ft. high, aromatic. Upper portions of twigs, also leaves, petioles, inflorescence, covered with whitish stellate hairs, dense on youngest parts. *Leaves*: stellate hairs more or less dense beneath, somewhat sparse on upper surface, papery; nerves 3–5 at base, pinnate above; petiole usually about one-third as long as the limb, sometimes nearly one-half as long, 1–3(–5) cm. l. *Racemes* 1–2 dm. l. *Flowers* sessile. *Male flowers*: *Calyx* 2·5 mm. l., segments oblong-ovate. *Petals* slightly over 2 mm. l., lanceolate, densely woolly inside. *Stamens* 16–18; filaments glabrous. *Female flowers*: *Calyx* 3 mm. l.; segments about 2 mm. l. *Petals* about 1 mm. l., linear, gland-tipped. *Ovary* white-tomentellous with stellate hairs. *Styles* branching into two below the middle, branches entire. *Capsule* about 1 cm. l., ellipsoidal, covered with stellate hairs.

12. *C. populifolius* Lam. *Encyc. ii.* 205 (1786); leaves 3–11 cm. l., ovate, shortly acuminate, base cordate, obtuse, or acute, serrate, with a few stellate hairs on both sides, teeth at base glandular, basal glands various, sometimes linear or wanting; stipules 5–10 mm. l., cut into linear gland-tipped segments.—*Sw. Prodr.* 101 & *Fl. Ind. Occ.* 1197; *Geisel.* op. cit. 27; *Griseb.* op. cit. 41; *Muell. Arg. tom. cit.* 653. *C. hircinus* *Vent. Jard. Malm.* 50 with t. (1803).

Southern parts, *Swartz!*—Cuba, Martinique, St. Vincent, Grenada, Bequia, Venezuela, Colombia, Panama.

Shrub to 5 or 6* ft. high, with a goaty smell; young parts villose. *Leaves*: nerves two on each side from base, pinnate above; petiole as long as the leaf to one-third as long. *Racemes* 5–15 cm. l. *Bracts* lanceolate, toothed, 4 mm. l. *Male flowers*: *Calyx* about 2·5 mm. l.; segments ovate, with a few stellate hairs outside, or glabrate. *Petals* about 3 mm. l., elliptical. *Stamens* 8–12; filaments pubescent below. *Female flowers*: *Calyx* about 5 mm. l.; segments oblong-lanceolate, villose outside and with groups of two or three glands together at intervals. *Petals* linear or lanceolate, acute, sometimes wanting. *Disk* ring-like. *Ovary* hispid with stellate hairs. *Styles* 4- or 5-parted, glabrous. *Capsule* 6–7 mm. l., broadly ellipsoidal.

13. *C. Wilsonii* *Griseb. Fl. Brit. W. Ind.* 40 (1859); leaves crowded as if whorled, 10–4 cm. l., elliptical to oblong-lanceolate, short or long acuminate, serrulate, teeth glandular, upper surface glabrous, beneath with a few stellate hairs, at length glabrate; glands cylindrical at base of midrib beneath, 2 or 1, or wanting; stipules small, inconspicuous.—*Muell. Arg. tom. cit.* 660.

Pepper Rod.

Wright! Lime savanna, Clarendon, *Purdie!* *Wilson!* *Fawcett!* Grandvala, Westmoreland, 500 ft.; Lapland, near Catadupa, 1500 ft.; Spur Tree

Hill, 2000 ft.; Black River to New Market, 150 ft.; near lighthouse, Negril, 300 ft.; Harris! Fl. Jam. 7102, 9167, 9859, 9880, 10,240; Negril, Britton & Hollick, 2083!—Type in Herb. Kew.

Shrub 3-9 ft. high; some of the nodes suppressed where the branches or inflorescence spring, so that three to five leaves come close together, as if whorled; young twigs rough with scattered flat-stellate hairs, at length glabrate. *Leaves*: nerves 3 at base, pinnate above; petiole 3-20 mm. l. *Racemes* terminal or axillary, 3-9 cm. l., glabrous. *Bracts* lanceolate, about 1 mm. l. *Pedicels*: male to 6 mm. l., in clusters of five or six, one flower opening at a time. *Male flowers*: *Calyx* about 2 mm. l., segments ovate-elliptical, glabrous, with a minute tuft of hairs at apex. *Petals* narrowly ovate-elliptical or obovate, 2·5 mm. l., pubescent on the lower half inside. *Stamens* about 24-(35 fide Muell.); filaments glabrous. *Female flowers* sessile, somewhat numerous. *Calyx*: segments 2·5-3 mm. l.; linear-lanceolate, without glands. *Petals* rudimentary. *Ovary* very hispid. *Styles* once 2-parted or 2-cleft, slender, longer than the ovary, coiled inwards at the apex. *Capsule* globular, about 5 mm. l. *Seeds* about 4 mm. l.

14. *C. glandulosus* L. *Syst. ed.* 10, 1275 (1759) & *Amœn. v.* 383, 409; leaves 2-3·5 cm. l., oblong-ovate, ovate, or elliptical, base obtuse, coarsely serrate, both sides sparsely covered with flat stellate hairs, or glabrescent, with two shortly stalked saucer-shaped glands at base of limb beneath (less than 1 mm. l.); stipules linear, not glandular, about 2 mm. l., soon falling.—*Geisel. op. cit.* 64; *Griseb. op. cit.* 41; *Muell. Arg. tom. cit.* 683; *Urb. Symb. Ant. iv.* 343. *C. divaricatus* Sw. *Prodr.* 100 (1788) & *Fl. Ind. Occ.* 1187; *Geisel. op. cit.* 32. *C. corchorifolius* *Geisel. op. cit.* 25 (1807). Type in Herb. Linn. from Browne.

Browne! *Broughton!* *Masson!* St. Andrew, *McNab!* *Macfadyen*, Kingston, *Prior!*—Cuba, Hispaniola, Porto Rico, St. Cruz, Antigua, Guadeloupe, Martinique, Trinidad, Curaçao, continental America.

Herb $\frac{1}{2}$ to 2 ft. high; stems usually herbaceous, sometimes woody, above with flat stellate hairs on branches, leaves, inflorescence, calyx, or glabrate. *Leaves* oblong-ovate, ovate, or elliptical base obtuse, coarsely serrate, with two shortly stalked saucer-shaped glands at base of limb beneath (less than 1 mm. l.), nerves pinnate and two at each side of the base, 2-3·5 cm. l.; petiole $\frac{1}{2}$ - $\frac{1}{3}$ as long as the blade; stipules linear. *Racemes* with subsessile flowers, 1·5-2 cm. l., or shorter. *Bracts* linear, with a small stalked globular mucronate gland on each side at the base. *Male flowers*: *Calyx* about 2 mm. l., segments oblong-elliptical, acute. *Petals* slightly longer than the calyx. *Stamens* 10, filaments glabrous. *Female flowers*: *Calyx*: segments unequal, spatulate with acute apex, to 3 mm. l., increasing in fruit to be nearly or quite as long as capsule. *Petals* minute, linear-lanceolate, gland-tipped. *Ovary* hirsute. *Styles* 2-parted almost to the base. *Capsule* 5-6 mm. l., globular-ellipsoidal, glabrate or with a few small stellate hairs. *Seeds* 4 mm. l., lined on the back with rows of minute pits.

15. *C. hirtus* L'Hér. *Stirp.* 17, t. 9 (1784); leaves 4-5·5 (2·5-7) cm. l., roundish to ovate, sometimes slightly lobed, some, especially the larger, doubly crenate-serrate, the smaller serrate, both sides with flat stellate hairs, usually only one ray developed on upper surface, with two long-stalked, cup-shaped, small glands

at base of limb on margin (1·5–2 mm. l.); stipules linear, to 5 mm. l., not glandular.—*Geisel.* op. cit. 62; *Griseb.* op. cit. 42. *C. glandulosus* var. *hirtus* *Muell. Arg.* tom. cit. 684 (1866).

St. Andrew, *McNab!* Kingston, *Prior!* Ferry; Liguanea plain; *Campbell!* King's House grounds, *T. Harris!* Liguanea plain, *Harris!* Fl. Jam. 5794, 6081, 6774, 6959, 11,799.—Trinidad, Central and tropical S. America.

Herb 1 to 2 ft. high; stems herbaceous; twigs densely covered with stellate hairs with one or more of the rays longer and more or less erect, the others much shorter and adpressed. *Leaves*: nerves prominent beneath, pinnate with two on each side at base; petiole usually $\frac{2}{3}$ to $\frac{1}{2}$ as long as the blade, of upper leaves shorter. *Racemes* with subsessile flowers, 1·5–2·5 cm. l. *Bracts* linear, 2–4 mm. l., with or without stalked glands. *Male flowers*: *Calyx* 1·5 mm. l.; segments elliptical to oblong-elliptical, acute, with stellate hairs outside. *Petals* oblong-linear, delicate, about as long as the calyx. *Stamens* about 10, filaments glabrous. *Female flowers*: *Calyx*, segments unequal, two longer, about 2·5 mm. l., two shorter, one very much shorter, obovate-oblong, becoming spathulate in fruit, and increasing to 4 mm. l. *Ovary* hirsute. *Styles*, two parted almost to the base. *Capsule* about 4 mm. l., globular or globular-ellipsoidal, with stellate hairs. *Seeds* 3 mm. l., pits indistinct, very dark grey with black dots.

16. *C. Griesbachianus* *Muell. Arg.* in *Flora* *xlvii.* 484 (1864) & in *DC. Prodr.* *xv. pt. 2.*, 586; leaves 3–7 cm. l., oblong, elliptical, or ovate, apex obtuse, acute, or shortly sub acuminate, base subcordate, obtuse, or truncate, more or less doubly serrate or serrulate, upper surface sparsely covered with stellate hairs or glabrate, beneath denser, without glands at base.—*C. Iserti* *Griseb.* *Fl. Brit. W. Ind.* 39 (non *Geisel.*). Griesbach's type in Herb. Kew.

March! Long Mountain, 700–900 ft., *Harris!* Healthshire Hills, *Harris & Britton!* Fl. Jam. 8944, 9614, 10,520.

Shrub 5–12 ft. high. Youngest parts of *twigs*, *petioles*, and *youngest leaves* covered with brownish, stellate tomentellum. *Leaves* 3–7 cm. l., oblong, elliptical, or ovate, apex obtuse, acute, or shortly sub acuminate, base subcordate, obtuse, or truncate, more or less doubly serrate or serrulate, without glands at base, papery, upper surface sparsely covered with stellate hairs or glabrate, beneath more densely covered; nerves 3–5 at base, pinnate above; petiole 1·5–2·5 cm. l. *Racemes* axillary as well as terminal, 2–4 cm. l. *Pedicels* 1–2 mm. l. *Bracts* linear-lanceolate, 1·5–4 mm. l. *Male flowers*: *Sepals* 5, about 2 mm. l., linear-lanceolate, stellate-haired outside. *Petals* 5, about 1·2 mm. l., oblong-elliptical, pubescent on the margin, with a bunch of long hairs at apex. *Stamens* about 12; filaments glabrous. *Female flowers* solitary at base of raceme. *Sepals* 5, linear, 3·5–4 mm. l. *Ovary* tomentellous. *Styles* 4-cleft, each branch with two short curved branches. *Capsule* not seen.

8. ARGYTHAMNIA Sw.

Shrub (in *A. candicans*), undershrubs, or perennial herbs, containing a purple pigment. Leaves alternate, entire or with few teeth, 3-nerved at base. Flowers monœcious, with petals, in

axillary spike-like 2-sexual racemes, each subtended by a bract, the upper flowers male, the lower (1–3) female; the glands of the disk alternate with the petals. Male flowers: Calyx-segments 4(–5), valvate. Petals 4(–5). Stamens 4(–5); filaments united at the very base; anthers dorsifixed. Female flowers: Sepals 5, imbricate. Petals 5, minute. Ovary 3-celled; styles spreading, variously cut; ovules solitary in the cells. Capsule breaking up into three 2-valved cocci. Seeds without a caruncle.

Species 55, natives of tropical and subtemperate America, including the West Indies.

A. candicans Sw. *Prod. 39* (1788) & *Fl. Ind. Occ. 336*, t. 8; Jussieu *Euphorb. Tent. t. 7*; Baill. *Étud. Euphorb. t. 15*, f. 30–36;

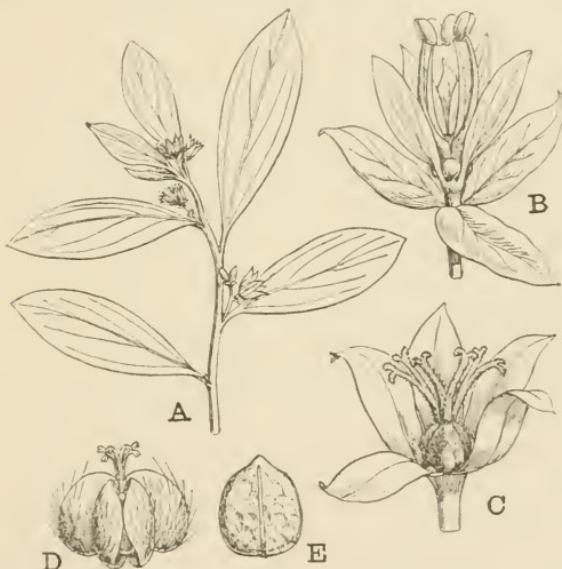


Fig. 92.—*Argythamnia candicans* Sw.

A, Portion of branch with inflorescence $\times \frac{1}{2}$.
B, Male flower $\times 7$.

C, Female flower $\times 4$.
D, Capsule $\times 3$.
E, Seed $\times 4$.

Griseb. Fl. Brit. W. Ind. 44; *Muell. Arg. in DC. Prodri. xv. pt. 2*, 741 (*Argyrothamnia*); *Urb. Symb. Ant. iv. 344*; *Pax in Engl. Pflanzenreich iv. 147*, vi. 80. *Ricino affinis odorifera... dilute purpureo Sloane Cat. 44 & Hist. i. 133, t. 86, f. 3.* *A. fruticosa albida* &c. *Browne Hist. Jam. 338.* (Fig. 92.) Type in Herb. Mus. Brit. Specimen from Swartz in Herb. Stockholm.

Near St. Jago de la Vega, *Sloane Herb. ii. 921* *Browne*; *Wright!* Long Mt., *Broughton!* *Swartz!* *Bertero*; *Macfadyen!* banks of Negro R.; sea coast, *Trelawney!* *Purdie!* *Wilson!* White River, *Prior!* *March!* J.P. 618, *Morris!* foot of Long Mountain; Ferry Pen; *Campbell!* Lucea, *Hitchcock*;

near Moneague, *Lord Walsingham*! Long Mt., 900 ft.; Chelsea Hill and Round Hill, St. Cruz Mts., 2000-2200 ft.; hill behind Ferry quarry, 200 ft.; Inverness, Clarendon, 200 ft.; *Harris*! Fl. Jam. 6149, 6330, 9055, 9690, 9702, 10,043, 11,686.—Bahamas, Cuba, Hispaniola, Porto Rico, St. Thomas, St. Cruz, St. Jan, St. Martin, St. Bartholomew, St. Lucia.

A straggling shrub, prostrate to 5 ft. high, with whitish bark, and all parts of the plant grey-whitish or purplish. Leaves 2-8 cm. l., lanceolate or lanceolate-elliptical, apex acute, base subacute, serrulate, adpressed-pubescent, glabrescent, or glabrate; nerves one on each side from the base, otherwise pinnate, prominent beneath. Racemes 1 cm. l. or less. Flowers greenish-white or whitish. Male flowers: Calyx about 2·5 mm. l.; segments 4, narrowly elliptical. Petals 4, as long as calyx, broadly elliptical, tapering to a very acute base, sometimes sub-3-lobed above. Stamens 4, longer than the calyx. Female flowers: Calyx-segments 5, 3 mm. l., increasing to 4·5 or 6 mm. in fruit, oblong-elliptical, oblong-ob lanceolate to sublinear in fruit, puberulous all over. Petals minute, about 5 mm. l., lanceolate. Ovary villose; styles villose, 2-forked once, each branch 2-lobed at apex. Capsule 3-4 mm. l., 5-6 mm. br. Seeds 2-2·5 mm. l., net-veined, obovoid.

9. CAPERONIA St. Hil.

Erect annual herbs, growing in swampy places, stems succulent. Leaves alternate; stipules persistent. Flowers monœcious (in W. Indian species), with petals, in 2-sexual axillary spikes or spike-like racemes, each subtended by a bract, the upper flowers male, the lower female. Disk wanting. Male flowers: Calyx-segments 5 or 6, valvate. Petals 5, imbricate, attached at the base of the staminal column and raised above the calyx. Stamens usually 10 in two whorls round the column; anthers ovoid, the cells separated by a short connection, and affixed at the middle, or subpendulous. Rudiment of the ovary at the apex of the column. Female flowers: Sepals 5 or 6, imbricate, generally unequal, the outer smaller than the inner. Petals 5. Ovary 3-celled; styles short, cut into many segments; ovules solitary in the cells. Capsule breaking up into three 2-valved cocci, spiny. Seeds subglobular, without a caruncle, very minutely dotted in a network pattern.

Species 33, natives of the tropics in America and Africa.

C. castaneifolia St. Hil. *Rem. Bras.* 245 (1824); *A. Rich.* in *Sagra Cub.* xi. 213; *Muell.* *Arg. in DC. Prodr.* xv. pt. 2, 754 & in *Fl. Bras.* xi. pt. 2, 324: *Pax in Engl. Pflanzenreich* iv. 147. vi. 31. *C. nervosa* *A. Rich. loc. cit.* 213 (1850). *C. palustris* *Griseb. Fl. Brit. W. Ind.* 43 (1859) (non *St. Hil.*). *Croton castaneifolium* *L. Sp. Pl.* 1004 (1753); *H. B. & K. Nov. Gen. & Sp. ii.* 70; *Geisel. Crot. Monog.* 60. (Fig. 93.) Specimen in Herb. Linn. in cover *Croton*.

Distin! Cornwall, St. Elizabeth, *Harris!* Fl. Jam. 12,096.—Cuba, Is. of Pines, Mexico, Nicaragua, Colombia, B. Guiana, Brazil, Paraguay.

Herb about 1 ft. high; stem, youngest portion with adpressed hairs,

then glabrous, simple or slightly branched, somewhat succulent, woody and hollow below, trailing and rooting in the mud of swampy places, then erect; roots fibrous, numerous. Leaves 2·5-7·5 cm. l., 4-1 cm. br., lanceolate-oblong, elliptical, or obovate, the larger above, distantly serrate, glabrous, or with a few hairs on nerves beneath; nerves 4-10 on each side from the base, pinnate above, slightly prominent on both sides; petiole 4-14 cm. l.; stipules ovate, acute, 1·5-2 mm. l. Spikes 2-5 cm. l., rachis slender, puberulous or glabrate. Bracts triangular-ovate, 1 mm. l., margin more or less ciliate. Flowers: male few, female 1 or 2. Male flowers: Calyx glabrous, 2·5 mm. l.; segments lanceolate, acute at both ends. Petals unequal, 3·4-2·5 mm. l., narrowly obovate to obovate-spathulate. Female flowers: Calyx about 3 mm. l., segments unequal, three outer shorter,

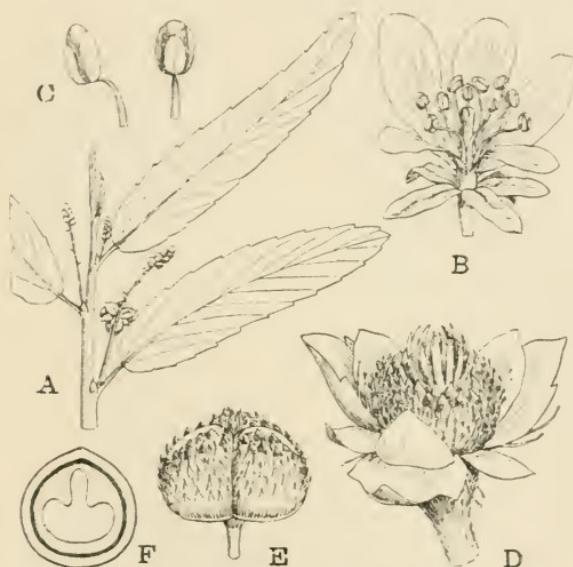


Fig. 93.—*Caperonia castaneifolia* St. Hil.

A, Portion of branch with leaves and inflorescence $\times \frac{1}{2}$.

B, Male flower $\times 5$.

C, Anthers $\times 12$.

D, Female flower $\times 5$.

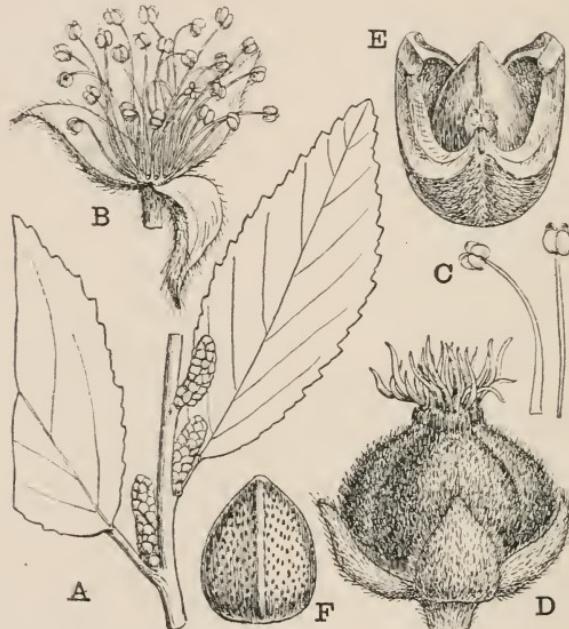
E, Capsule (calyx removed) $\times 2\frac{1}{2}$.

F, Seed cut lengthwise, enlarged.

1-1·5 mm. l., three inner alternate, longer, 2·5 mm. l., slightly lobed above, with 1-3 gland-tipped hairs about the middle of the margin on each side or lower, about 1 mm. l. Petals white, varying in form, obovate to elliptical, and in size, 1·7-2 mm. l. Ovary covered with overlapping processes, near the apex narrowly ovoid, acute, gradually changing downwards into soft hair-like gland-tipped processes with a narrow horizontal base. Styles broad at the entire narrow base, splitting up just above the base into 6 or 7 pointed segments, the central one about 1 mm. l., the others decreasing in size outwards. Capsule 3·5 mm. l., 6 mm. br., the processes on the ovary persistent, deeply 3-furrowed, with the calyx persistent, and somewhat increased in size.

10. BERNARDIA Adans.

Shrubs (or herbs) with stellate or simple hairs. Leaves alternate, dentate. Flowers monoecious or dioecious, without petals, in axillary spikes. Spikes sometimes very short, of both male and female flowers densely crowded with overlapping bracts. Male flowers usually minute, the female sometimes with a few bracts. Petals none. Disk none, or of separate glands. Male flowers: Calyx in the bud globose and closed, valvately 3-4-parted in flowering. Stamens indefinite (3-25); filaments

Fig. 94.—*Bernardia carpinifolia* Griseb.

A, Portion of branch with leaves
and male inflorescence in bud
B, Male flower $\times 9$.

C, Stamens $\times 11$.
D, Female flower $\times 7$.
E, Coccus with seed $\times 3$.
F, Seed $\times 3$.

free; anthers, as it were, 4-celled crosswise, each cell being 2-globose. No rudiment of ovary. Female flowers: Sepals 6 (5-9), imbricate. Ovary 3-celled; styles 3, cut into numerous thread-like segments (in Jamaican species); ovules solitary. Capsule splitting up into three 2-valved cocci. Seeds subglobose, without a caruncle.

Species nearly 40, natives of tropical and subtropical America.

B. carpinifolia Griseb. *Fl. Br. W. Ind.* 45 (1859). B. fruticosa foliis tomentosis &c. *Browne Hist. Jam.* 361. B. dichotoma

Muell. Arg. in *Linnæa* xxix. 172 (1865) & in *DC. Prodr.* xv. pt. 2, 917; Urb. *Symb. Ant.* ir. 345. *B. viscosa* Griseb. in *Mem. Acad. Amer. Sci. & Art. n.s. viii.* 159 (1860). *B. Bernardia* Millsp. in *Field Col. Mus. Bot.* ii. 58, 155 (1900). *Adelia* *Bernardia* L. *Syst. ed.* 10, 1298 (1759) & *Amaen.* v. 383. (Fig. 94.) There is a specimen from Browne in Herb. Linn. in genus cover *Adelia*, and named by Linnaeus *Bernardia*. A type from Grisebach is in Herb. Kew.

Houston! Browne! Wright! Masson! Bertero; Wilson! March! Long Mt., 350 ft., Campbell! Round Hill, St. Cruz Mts., 1600 ft.; Luana Point; Long Mt., 100 ft.: Albion Mt., St. Thomas; Harris! Fl. Jam. 6146, 9704, 9902, 11,945, 12,192.—Bahamas, Cuba, Cayman, Hispaniola, Porto Rico, St. Vincent.

A straggling shrub, 2-18 ft. or tree 25 ft. high, monœcious or diœcious. Leaves 3-10 cm. l., elliptical-ovate, oblong-ovate, or lanceolate, serrate, tomentose with some stellate hairs on both sides; nerves 2 on each side at base, pinnate, slightly prominent beneath; petiole 5-12 cm. l., tomentose; stipules linear-acuminate, 2 mm. l. Spikes 8-3·4 cm. l. or shorter, tomentose. Bracts: male, about 1·5 mm. l., densely puberulous outside, transversely somewhat elliptical, margin serrate, with 3-5 flowers; female, one with 2 bracteoles under each flower, narrowly ovate. Male flowers opening after fall of subtending leaf: Calyx about 2 mm. l., puberulous outside; segments elliptical, acute. Receptacle glandular. Stamens 15-25, longer than the calyx. Female flowers: Calyx about 2·5 mm. l., puberulous outside; segments unequal, ovate, acute. Ovary densely tomentose. Capsule globular-3-lobed, tomentose, 7 mm. l. Seeds globular-ovoid, slightly 3-angled, marbled with blackish marks, 6 mm. l.

11. ADELIA L.* (in part).

Shrubs, glabrous (except inflorescence), more or less spiny. Leaves alternate or crowded at the nodes, membranous or papery (when dry), entire; petioles very short. Flowers small, diœcious, without petals, clustered on cushions in axils of leaves, the male short-stalked or sessile, the female long-stalked, solitary or in clusters of 2 or 3. Male flowers: Calyx closed in bud, valvately 5-parted in flowering. Disk attached to the base of the calyx. Stamens 8-15; filaments attached to a central column or prominence; anthers versatile, attached near the base at the back, cells parallel, opening longitudinally. Female flowers: Calyx 5-parted, valvate. Disk flattened. Ovary 3-celled; styles 3, reflexed-spreading, much cut; ovules solitary. Capsule splitting up in three 2-valved cocci. Seeds subglobular, without a caruncle.

Species about 10, natives of the West Indies and Central America.

* *Adelia* of Browne (*Hist. Jam.* 361, t. 36, f. 3) is *Forestiera porulosa* Poir. (*Encyc. Suppl.* ii. 664) = *Myrica segregata* Jacq. (*Coll.* ii. 273) = *Adelia segregata* Kuntze Rev. Gen. ii. 409 (*Oleaceæ*).

- Stamens attached to a central prominence. Leaves oblong-obovate, or elliptical, or obovate..... 1. *A. Ricinella*.
 Stamens attached to a central column. Leaves oblanceolate 2. *A. hamiolandra*.

1. *A. Ricinella* L. *Syst. ed.* 10, 1298 (1759) & *Amœn. v.* 411, 383; leaves oblong-obovate, or obovate, or elliptical; stamens 8-15, attached to a central prominence.—*Griseb. Fl. Br. W. Ind.* 45; *Urb. Symb. Ant.* iv. 346. *A. foliis obovatis &c.* *Browne Hist. Jam.* 361. *A. pedunculosa* *Rich. in Sagra Cub.* xi. 210 (1850). *Ricinella pedunculosa* *Muell. Arg. in Linnaea xxxiv.* 154 (1865)

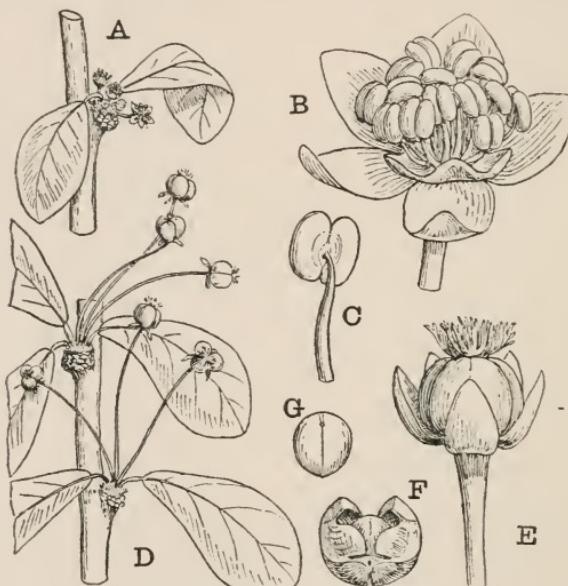


Fig. 95.—*Adelia Ricinella* L.

- A, Portion of stem with male flowers $\times \frac{1}{2}$. E, Female flower with ovary ripening $\times 4$.
 B, Male flower $\times 5$. F, Coecus with seed $\times 2$.
 C, Stamen $\times 10$. G, Seed $\times 2$.
 D, Portion of stem with female flowers $\times \frac{1}{2}$.

& in DC. *Prodr. xv. pt. 2*, 729. *Cucurbitifera arbor forte Rhamni &c.* *Sloane Cat.* 207 & *Hist. ii.* 175. (Fig. 95.) Type in Herb. Linn., apparently from Browne.

Wright! Swartz! arid plains, Westmoreland, Purdie! Watson's Hill, Manchester, 800 ft.; Negril; between Town Savanna and Two Mile Wood, Sloane Herb. vii. 109! Harris! Fl. Jam. 6378, 10,222, 10,234.—Cuba, Hispaniola, Porto Rico, St. Thomas, St. Cruz, St. Jan, St. Martin, Tobago.

Tree 15-30 ft. high, or shrub 6-10 ft.; branches with white bark, erect to spreading, apex spiny, glabrous. *Leaves* 1·5-7·5 cm. l.; petiole 1-5 mm. l. *Male flowers*: *Pedicel* as long as, or longer than, the flower. *Calyx* 2·5-3 mm. l., sepals unequal, oblong. *Disk* saucer-like, margin orange-coloured. *Female flowers*: *Pedicel* 1-5 cm. l. *Sepals* unequal, to 3 mm. l., lanceolate to linear. *Ovary* tomentose. *Capsule* 8 mm. in diam.,

5 mm. l., puberulous, flattened-globular-3-lobed. Seeds globular, 3 mm. in diam., light brown.

2. *A. hæmiolandra* Pax in Engler's *Pflanzenreich* iv. 147. vi. 77 (1912); leaves oblanceolate; stamens 15, springing from a central column, ten about halfway, five higher up.—*Ditaxis hæmiolandra* Griseb. *Fl. Br. W. Ind.* 44 (1859). *Ricinella hæmiolandra* Muell. Arg. in *DC. Prodr.* xv. pt. 2, 730 (1866). Type in Herb. Kew.

Macfadyen! *Purdie!*

Shrub with white bark, branches sometimes with axillary spines, glabrous. Leaves 4-7 (3-8) cm. l.; petiole 3-4 mm. l. Male flowers: Pedicels about as long as the flower. Calyx tomentellous outside, about 3 mm. l., sepals more or less equal, oblong-ovate, acute. Disk irregularly lobed, lobes opposite sepals. Female flowers not seen.

12. LASIOCROTON Griseb.

Shrubs or trees. Leaves alternate, nerves pinnate. Flowers monœcious or diœcious, without petals, in spikes, or racemes, or panicles, which are solitary in the upper axils; the male spikes with flowers densely crowded in clusters, the female racemes long, lax, with several stalked distant flowers; pedicels jointed. Male flowers: Calyx ovoid, closed in bud, at length splitting into five valvate segments. Disk poorly developed. Stamens 8 to 18. Rudiment of ovary wanting. Female flowers: Calyx small, 5-parted, spreading, open in bud. Disk thick, entire. Ovary 3-celled; styles very shortly united below, short, thick, undivided or 2-lobed, apex very shortly fringed; ovules solitary. Capsule deeply 3-lobed-globular, splitting up into three 2-valved cocci. Seeds globular, without a caruncle.

Species 3 or 4, natives of Jamaica, Bahamas and Cuba.

- | | |
|--|-----------------------------|
| Venation of leaves beneath very prominent. Styles
not cleft halfway | 1. <i>L. macrophyllus</i> . |
| Venation of leaves beneath not prominent. Styles
2-cleft halfway. | |
| Leaves glabrous beneath. Petioles long,
7-2·5 cm. l. | 2. <i>L. Fawcettii</i> . |
| Leaves tomentose beneath. Petioles short,
2-1 cm. l. | 3. <i>L. Harrisii</i> . |

1. *L. macrophyllus* Griseb. *Fl. Br. W. Ind.* 46 (1859): leaves 5-14 cm. l., roundish, elliptical, or ovate, apex acute, obtuse, or rounded, base slightly cordate, leathery, tomentose and soft to the touch on both sides, nerves and veins very prominent beneath, more or less evident above, two on each side near the base: petioles 1·5-4 cm. l., tomentose; styles not divided.—Muell. Arg. in *DC. Prodr.* xr. pt. 2, 955; Millsp. in

Field Columb. Mus. Bot. ii. 156. *Croton macrophyllus Sw. Prodr.* 100 & *Fl. Ind. Occ.* 1196. (Fig. 96.)

Wright! Salt-pond Hill, Broughton! March! Great Pedro Bay; Grant's Pen near Albion Estate, Harris! also Harris & Britton! Fl. Jam. 9714, 10,742, 11,651, 11,710, 11,868.

Shrub or tree to 25 ft. high. Young twigs, leaves, inflorescence, parts of flowers, and capsules densely tomentose and soft to the touch. Leaves crowded at the apex. Inflorescence racemose, flowers monoeious, on separate branches, occasionally with a female flower on the male inflorescence. Male inflorescence suberect or spreading, 3-4 cm. l.; peduncle to

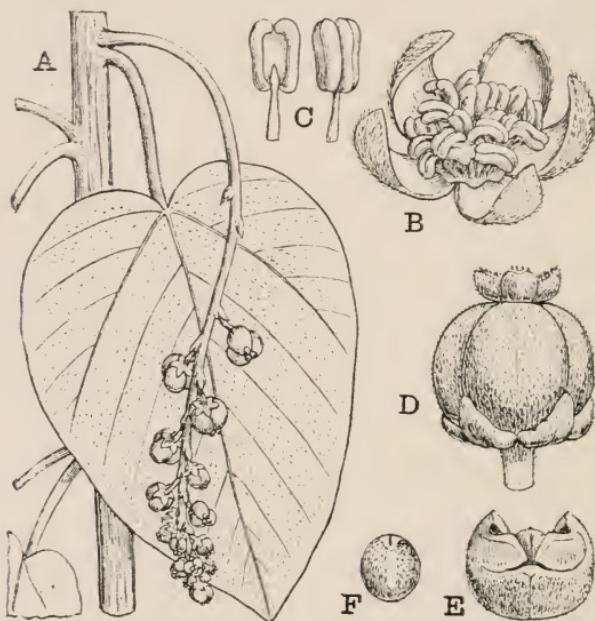


Fig. 96.—*Lasiocroton macrophyllus* Griseb.

A, Part of branch with female inflorescence $\times \frac{2}{3}$.
B, Male flower $\times 5$.
C, Stamens $\times 10$.

D, Female flower, ovary ripening $\times 4$.
E, Coccus $\times 2$.
F, Seed $\times 2$.

2 cm. l. Male flowers growing together in close clusters, the older flowers developing pedicels and dropping off probably soon after opening. Calyx globular while unopened. Stamens 8-13; filaments short, partially united at the base; anthers attached at a point about the middle. Fruiting racemes spreading or pendulous, 5-1.5 dm. l. Pedicels 8-4(-2) mm. l. Fruiting calyx 2-3 mm. l. Capsule 5 mm. l. Seeds dark olive-grey with blackish markings, 3 mm. in diam.

Specimens from Bahamas (*Wilson 7833*) and Cuba (*Shafer 2554*) with young male flowers only have been referred to this species, but appear to us to be different.

2. *L. Fawcettii* Urb. *Symb. Ant.* vi. 14 (1909); leaves 15-26 cm. l., oval-elliptical, acuminate, base obtuse or somewhat

acute, somewhat thickly membranous or papery, smooth and shining on both sides, nerves slightly prominent on both sides, pinnate, one on each side from close to the base, and often one marginal; petioles 2·5–7 cm. l., tomentose; styles cleft halfway.

Dolphin Head, Harris! Fl. Jam. 10,283, 10,306.

Tree 20–30 ft. high. Young twigs, inflorescence, parts of flowers, capsules tomentose. *Inflorescence* to more than 3 dm. l. with long peduncle. *Male inflorescence* paniculate, branches very short or wanting, so that the flowers are clustered. *Pedicels* 2–7 in each cluster, to 8 mm. l. *Calyx* unopened globular, 2–3 mm. in diam. splitting into five segments 3·5–4 mm. l. *Stamens* about 17 or 18. *Female inflorescence* racemose with flowers solitary, distant. *Fruiting calyx* about 2 mm. l. *Capsule* 5 mm. l. *Seeds* olive-grey, 3 mm. in diam.

3. *L. Harrisii* Britton in Bull. Torr. Bot. Club xli. 16 (1914); leaves 6–15 cm. l., elliptical, shortly and acutely acuminate, base obtuse, papery-leathery, puberulous on nerves on both sides, otherwise glabrous on upper surface, tomentose and soft to the touch beneath, nerves and veins slightly prominent on both sides, nerves one on each side at base marginal, one somewhat near base; petioles 1–2 cm. l., tomentose; styles cleft halfway.

Peckham, Clarendon, 2,500 ft., Harris! Fl. Jam. 11,192.

Tree 25 ft. high, apparently dioecious. Youngest portions of twigs, inflorescence, parts of flowers, and capsule tomentose and soft to the touch, leaves crowded at the apex, twigs stout, marked with large prominent scars of fallen leaves. *Male flowers* not seen. *Female racemes* more or less erect, to 10 cm. l. *Pedicels* 1–1·5 cm. l. *Fruiting calyx* to 3 mm. l. *Capsule* 5 mm. l., 7 mm. br. *Seeds* ellipsoidal-globular, pinkish-grey marked with minute white dots, about 3 mm. l.

13. ALCHORNEA Sw.

Trees or shrubs. Leaves alternate, 3–5-nerved and glandular at the base. Flowers dioecious or monoeious, without petals, in axillary or lateral spikes or racemes; the male spikes slender, simple or paniculate, with small flowers clustered along the rhachis, the female spikes or racemes simple, with a single flower under each bract. Disk generally wanting. Male flowers: Calyx globose and closed in the bud, valvately 4-(3-2-)parted during flowering. Stamens 8 or fewer, united at the base to form a saucer-shaped membrane. Rudiment of ovary none. Female flowers: Segments of perianth 4 (3–6), imbricate. Ovary 2(-3)-celled; styles 2(-3) distinct, undivided or rarely 2-lobed, long-exserted; ovules solitary. Capsule splitting into two (or three) 2-valved cocci. Seeds subglobose, without a caruncle.

Species about 60, natives of the tropics.

A. latifolia Sw. Prodr. 98 (1788) & Fl. Ind. Occ. 1154, t. 24; Jussien Euphorb. Tent. 42, t. 13, f. 41; Hayne Arzneyk. x. t. 42;

Griseb. Fl. Br. W. Ind. 46; *Muell. Arg. in DC. Prodr.* xv. pt. 2, 908; *Urb. Symb. Ant.* iv. 345.

■ Dove Wood.

Wright! Broughton! Masson! Macfadyen! Morce's Gap, Purdie! Wilson! common in pastures, Moneague, Prior! March! near Cinchona, J.P. 1041, Morris! Windsor, near Darliston, 1200 ft., Harris! John Crow (Blake) Mts., 1200 ft., Harris & Britton! Fl. Jam. 9906, 10,707.—Cuba, Hispaniola, Porto Rico, Mexico.

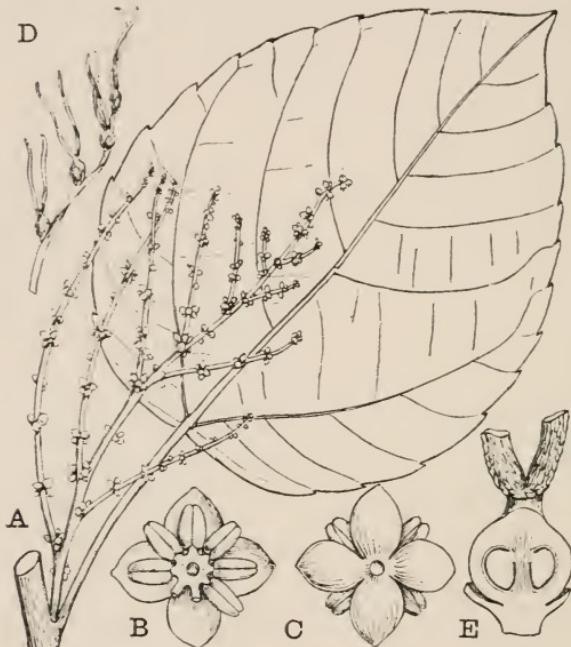


Fig. 97.—*Alchornea latifolia* Sw.

- | | |
|---|---|
| A, Leaf and male inflorescence $\times \frac{1}{2}$. | D, Small portion of female inflorescence $\times \frac{1}{2}$. |
| B, Male flower with two anthers removed
$\times 3$. | E, Ovary of female flower cut lengthwise
$\times 4$. |
| C, Ditto seen from below $\times 3$. | |

Tree 20–40 ft. high. *Leaves* 1–3 dm. l., elliptical or ovate, apiculate, bluntly glandular-dentate, leathery, 3-nerved at base, nerves beneath very prominent. *Spikes* to 2 dm. l.: male paniculate, female simple, solitary or two together. *Male flowers*, in bud, globular, about 2 mm. in diam. *Female flowers*: *Styles* shortly united at base, to 1·5 cm. l. *Capsule* brownish-red, 7 mm. l., 9–10 mm. in diam.

14. ACALYPHA L.

Herbs, shrubs or small trees. Leaves alternate, pinnately-veined, sometimes 3–5-nerved from the base, generally serrate and long-stalked. Flowers monœcious, but *A. scabrosa* diœcious, without petals; male flowers small, clustered in the axil of small

bracts, arranged in spikes, catkin-like or slender and elongated; female solitary or 2–4 together in the axil of a leafy bract; female bracts increasing in fruit, solitary or few at the base of the male spikes, sometimes in a distinct spike; male and androgynous spikes mostly axillary; female axillary, lateral, or terminal, solitary or clustered. Disk wanting. Male flowers: Calyx closed in the bud, valvately 4-parted in flowering. Stamens 8(–16); filaments free; anther-cells free, hanging from the apex of the filament, usually flexuous, worm-like, opening at the apex. No rudiment of ovary. Female flowers: Sepals 3–4, imbricate. very small. Ovary 3-celled; styles 3, free, thread-like, generally much branched; ovules solitary. Capsule splitting up into three 2-valved cocci. Seeds without a caruncle.

Species, about 370, widely dispersed through the tropics, a very few beyond the tropics in America.

Inflorescence 2-sexual (see also *A. virgata*).

- Leaves roundish to oblong-lanceolate, 1–3 cm. l.
Perennial herb, stems to 1 ft., woody often
below..... 1. *A. chamædrifolia*.
- Leaves ovate acuminate, 4–8 cm. l. Shrub, 2–4 ft. 2. *A. cuspidata*.

Inflorescence 1-sexual.

- Female bracts few. Shrub 1–6 ft., dioecious 3. *A. scabrosa*.

- Female bracts many. Plants monœcious.

Female spike terminal. Annual herbs.

- Female spike plume-like; bract with long
bristle-like apex 4. *A. alopecuroidea*.
- Female spike not plume-like; bract to 2 mm. l. 5. *A. corchorifolia*.

Female spike axillary. Shrubs or small trees.

Fruiting bracts 5–9 mm. l.

Leaves crenate-serrulate.

- Young twigs, petioles, and inflorescence
puberulous. Fruiting bracts to 8
mm. l., notched to $\frac{1}{3}$ or $\frac{1}{4}$ of its length
into triangular-deltoid teeth 6. *A. virgata*.

Glabrous. Fruiting bract cleft below
middle.

- Fruiting bract with lanceolate-linear
lobes 7. *A. lavigata*.

Fruiting bract with oblong obtuse lobes

- Leaves strongly serrate. Young twigs,
petioles, and inflorescence densely
pubescent 8. *A. pruinosa*.

Fruiting bract less than 5 mm. l.

- 9. *A. jamaicensis*.

- 10. *A. elliptica*.

1. *A. chamædrifolia* Muell. Arg. in DC. Prodr. xv. pt. 2,
879 (1866) (excl. vars.); herb, perennial, often woody below;
leaves roundish to oblong-lanceolate, 1–3 cm. l.; inflorescence
2-sexual; Urb. Symb. Aut. iv. 347; Chapman, Fl. S.U.S. ed. 3, 428;
Prain & Hutchinson in Kew Bull. 1918, 26. *A. indica* var.

β L. Sp. Pl. 1003 (1753) (excl. syn.). A. reptans Sw. Prodr. 99 (1788) & Fl. Ind. Occ. 1170; Willd. Sp. Pl. iv. 523; Griseb. op. cit. 48. A. corchorifolia Willd. tom. cit. 524 (1805); Chapman Fl. S.U.S. 406; Small Fl. S.E.U.S. 700. Urtica minor iners &c. Sloane Cat. 38 & Hist. i. 125, t. 82, f. 3. Tragia mercurialis L. Amœn. v. 409, 382 (1760) & Sp. Pl. ed. 2, 1391 (in part). Croton foliis cordatis &c. Plum. Pl. Amer. (Burm.) 165, t. 172, f. 2. Croton chamaedrifolium Lam. Encyc. ii. 215 (1786). (Fig. 98.) A specimen from Browne in Herb. Linn. named *Tragia mer-*

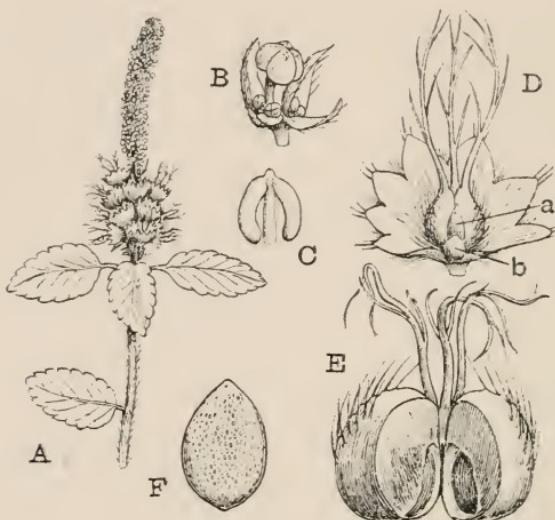


Fig. 98.—*Acalypha chamaedrifolia* Muell. Arg.

- A, Portion of flowering branch, nat. size.
 B, Cluster of male flowers with one ready to open $\times 11$.
 C, Stamen, much enlarged.
 D, Female flower; a, sepal; b, bud, $\times 11$.
 E, Capsule with one coccus removed $\times 11$.
 F, Seed $\times 10$.

curialis in Solander's hand. A specimen collected by Swartz in Hispaniola is in Herb. Mus. Brit.

Town savanna, Sloane Herb. ii. 77! Browne! Wright! St. Andrew, McNab! Wilson! Lititz savanna, Manchester, amongst grasses and in crevices of rocks in thickets, 300–800 ft.; Two Mile Wood, St. Catherine; Harris! Fl. Jam. 11,730, 12,404, 12,438.—Florida and Keys, Cuba, Is. of Pines, Hispaniola, Porto Rico, St. Thomas, St. Cruz, Guadeloupe.

Tap-root thick, woody, growing vertically or at various angles. *Stems*, sometimes with rhizomes more or less horizontal, woody at base, erect to spreading-procumbent, to 1 ft. long or high; branches villose, especially on young parts. *Leaves*: margin crenate, nerves pinnate, one on each side from the base, membranous, more or less pubescent; petiole 2–10 mm. l., villose; stipules small, lanceolate. *Spikes* 1–3 cm. l., terminal and in axils of upper leaves, the portion above with male flowers deciduous, 4–8 female bracts below, crowded; rhachis villose. *Male bracts* linear, pubescent, .6–1 mm. l., fruiting bracts about 3 mm. l., divided one-third

of the way down into about 7 to 9 triangular lobes, villose outside, enclosing two flowers, one developing before the other. *Capsule* 3-lobed-globular, villose on upper part, 1·6 mm. l. *Seeds* dark brown, ellipsoidal, 1-1·2 mm. l.

2. *A. cuspidata* Jacq. *Hort. Schoenbr.* ii. 63, t. 243 (1797) : shrub ; leaves ovate, acuminate, 4-8 cm. l. ; inflorescence 2-sexual. —*Griseb. Fl. Br. W. Ind.* 48. *A. cuspidata* var. *genuina* Muell. Arg. in *DC. Prodr.* xv. pt. 2, 858 (1866).

Halberstadt, *Macfadyen!* Round Hill, St. Cruz Mts., 1800 ft. ; coast between Portland Point and Rocky Point ; *Harris!* Fl. Jam. 9705, 10,185. — Cuba, Hispaniola, S. Vincent, tropical S. America.

Shrub 2-4 ft. high ; tomentose on young parts. *Leaves* 4-8 cm. l., ovate, acuminate, base slightly cordate, crenate-serrate, nerves pinnate, with three on each side from the base, usually softly tomentose to the touch or glabrate, pubescent on the nerves ; petiole 1·5-3 cm. l., tomentose or pubescent ; stipules linear, broader at base, to 6 mm. l., soon falling. *Spikes* 2-sexual, axillary, somewhat longer than the petiole, 2-4 cm. l., male flowers numerous with 1 to 3 female flowers at base ; rhachis villose-tomentose, hairs often glandular. *Fruiting bracts* entire, slightly uneven, somewhat rounded in outline with cordate or truncate base, about 2 mm. in diam., tomentose outside and on the margin, enclosing two flowers. *Capsule* 3-lobed-globular, villose, with a few glandular hairs, nearly 2 mm. l. *Seeds* ellipsoidal, covered with minute projecting points, about 1·2 mm. l.

3. *A. scabrosa* Sw. *Prodr.* 99 (1788) & *Fl. Ind. Occ.* 1175 ; inflorescence 1-sexual, dioecious ; female bracts few ; shrub.—*Griseb. Fl. Br. W. Ind.* 47 ; *Muell. Arg. in DC. Prodr.* xv. pt. 2, 862. *A. scabrosa* Sw. var. *ovata* *Griseb. loc. cit.* *A. betulæfolia* *Sw. Prodr.* 100 (1788) & *Fl. Ind. Occ.* 1177 ; *Griseb. loc. cit.* *A. scabrosa* var. *betulæfolia* and *ovata* *Muell. Arg. loc. cit.* *A. scabrosa* var. *elongata* *Urb. Symb. Ant.* v. 389 (1908). Specimens from Swartz of both his species in Herb. Mus. Brit. & in Herb. Stockholm.

Wright! *Broughton!* *Swartz!* *Macfadyen!* Ocho Rios, *McNab!* Port Royal Mts., *Purdie!* *Wilson!* St. Ann's Bay ; Ocho Rios ; Liguanea Hills ; *Prior!* Liguanea plain, 600-650 ft., *Campbell!* Blue Mts. ; Long Mt., 200-300 ft. ; Yardley Chase, 1600 ft. ; Constant Spring to Bardowie, 800 ft. ; *Harris!* Hectors River, *Harris & Britton!* Bog Walk, *Britton*, 2626 ! Fl. Jam. 5158, 5601, 5750, 5908, 6256, 8924, 9578, 9669, 10,717, 12,104.

Shrub 1-6 ft. high, erect or with branches trailing over rocks, dioecious, rarely monoecious. *Branches* numerous, pubescent. *Leaves* variable in size, form and hairiness, ·5-8 cm. l., narrowly elliptical to elliptical-roundish, ovate or lanceolate, apex rounded to acute or sub-acuminate, base rounded to wedge-shaped, serrate or crenate, nerves pinnate, one on each side at base, papery, pubescent or glabrescent on nerves, surface glabrous or tomentose ; petiole 1 mm.-1 cm. l., pubescent or glabrous ; stipules small, very soon falling. *Spikes* axillary : male ·5-2·5 cm. l., with numerous flowers ; female to ·5 cm. l., with three or four bracts. *Fruiting bracts* 4 mm. l., with 4-10 triangular unequal acute teeth or lobes, usually about one-third length of bract, villose and ribbed outside, enclosing one or two flowers. *Capsule* 3-lobed-globular, villose on upper part, about 1·7 mm. l. *Seeds* brown, ovate-ellipsoidal, about 1·4 mm. l.

There are two well-marked forms, one with leaves oblong-lanceolate, serrate, more or less hairy (*A. scabrosa* Sw.), the other with leaves roundish to elliptical, crenate, glabrous except on nerves (*A. betulæfolia* Sw.); but these forms are connected by intermediates. A form with blunt ovate glabrescent leaves is *A. scabrosa*, var. *ovata* Griseb., one with elongated lanceolate softly hairy leaves is var. *clongata* Urban.

4. *A. alopecuroides* Jacq. *Collect. iii.* 196 (1789) & *Ic. Pl. Rav. iii. t. 620*; annual herb; inflorescence 1-sexual; female spike terminal, plume-like, sometimes apparently axillary through shortness of branch, with a bristle-like appendage at the apex about 1 cm. l., tipped with an abortive flower; fruiting bract divided into 3–5 segments 7–10 mm. l., triangular-ovate at the base, apex long, bristle-like.—*Willd. Sp. Pl. iv.* 526; *Muell. Arg. tom. cit.* 882; *Millspaugh in Field Columb. Mus. Bot. ii.* 58, 156; *Britton in Bull. Torr. Bot. Cl. xli.* 12.

A weed, Hope, near Porus, 1150 ft., *Harris!* Fl. Jam. 8210.—Bahamas, Cuba, Cayman Is., Hispaniola, Porto Rico, Grenada, Mexico, Honduras, Guatemala, Panama, Colombia, Venezuela.

Roots much branched, fibrous. Stem erect, branching from near the woody base, 7 in. to 1½ ft. high, branches pubescent. Leaves 2–4(–7) cm. l., ovate, with a short narrow acuminate apex, base rounded or truncate, serrate, nerves pinnate, generally two on each side from the base, membranous, usually glabrous, sometimes sparingly pubescent; petiole generally as long as the leaf, 2–3(–4) cm. l.; stipules small, linear-lanceolate. Spikes: male axillary, very short, 3–9 mm. l.; female 5–2 cm. l. Fruiting bracts enclosing one capsule, membranous, covered with hairs, some long, 1–5–2 mm. l., some glandular, short. Capsule 1–3–1·4 mm. l. Seed ellipsoidal, about 1 mm. l.

5. *A. corchorifolia* A. Rich. in *Sagra Cub. xi.* 203 (1850) (non *Willd.*); herbaceous annual; inflorescence 1-sexual, male and female on the same branch, female usually terminal, somewhat lax-flowered; fruiting bract about 2 mm. l., divided to near the middle into about twenty oblong acute lobes.—*A. polystachya* Griseb. *Fl. Br. W. Ind.* 48 (1859) (non *Jacq.*). *A. persimilis* Muell. Arg. in *Linnæa xxiv.* 25 (1865) & in *DC. Prodr. xv. pt. 2*, 842; *Urb. Symb. Ant. iv.* 347.

St. Elizabeth, *Wullschlaegei*.—Cuba, Porto Rico, Mexico. A specimen from the "West Indies" named *A. corchorifolia* by Swartz is in Herb. Stockholm.

Smoothly puberulous on young twigs and petioles. Leaves 3·5–7 cm. l., ovate, acuminate, base slightly cordate, serrate, membranous, nerves two on each side from the base, and a supplementary one, puberulous; petiole nearly as long as the leaf. Spikes: male slender, axillary, to 1·2 cm. l., with peduncle about as long as spike; female occasionally in axils of upper leaves, 4–5 cm. l. Female bract 1-flowered, rough. Capsule about 2·5 mm. l., rough with tubercles. Seeds grey, rough and wrinkled, ovate-globular, 2 mm. l.

6. *A. virgata* L. *Syst. ed. 10*, 1275 (1759) & *Amoen. v. 410*, 383 (the reference on p. 383 of the specific name to Browne's

No. 1 instead of No. 2 is evidently a mistake which has been copied into Sp. Pl. ed. 2); shrub, with youngest part of twigs, also the petioles, and peduncle with rhachis of inflorescence, puberulous, at length glabrate; leaves crenate-serrulate; inflorescence unisexual (or the male spike rarely with one female bract near the base), female spike axillary; fruiting bracts many, 7-9 mm. l., notched to about $\frac{1}{3}$ or $\frac{1}{4}$ of its length into 7-9 triangular-deltoid teeth or lobes.—*Sw. Fl. Ind. Occ.* 1169: *Griseb. Fl. Br. W. Ind.* 47; *Muell. Arg. in DC. Prodr. xv. pt. 2*, 816. *A. erecta* *virgultosa* &c. *Browne Hist. Jam.* 346, t. 36, f. 2. Type, Browne's specimen, in Herb. Linn.; there is also a specimen from Browne in Herb. Mus. Brit.

Browne! *Wright!* *Swartz!* *Macfadyen!* *Purdie!* *Wilson!* *March!* J.P. 1116, 1159, *Morris!* Woodcutters Gap; Clydesdale, 3600 ft.; *Harris!* Fl. Jam. 5247, 5467, 5507.

Shrub 10-15 ft. high, monœcious. Leaves 5-15 cm. l., elliptical to narrowly oblong-elliptical, acuminate, base obtuse or subcordate, glabrate, nerves pinnate, veins distinct, especially beneath, membranous; petiole 5-4 cm. l. Spikes axillary, pedunculate, male and female usually on different branches, sometimes on the same branch, when the male is on younger wood than the female; male 5-10 (3-14) cm. l., female 4-6 (3-7.5) cm. l., with 5-10 bracts or clusters of two or three at intervals. Male bracteoles ovate. Female bracts hispidulous on and just below margin on inner side, enclosing one or two flowers. Capsule about 2 mm. l., puberulous. Seeds ovate-ellipsoidal, about 1.8 mm. l.

Var. *pubescens* *Fawc. & Rendle in Journ. Bot. lvii.* 314 (1919): young branches, petioles, midrib and nerves densely pubescent; leaves sparingly pubescent on both sides; petioles 2-8.5 cm. l.: female spikes to 8 cm. l.; female bracts hispidulous on margin and outer surface. Type in Herb. Kew and in Herb. Jam.

Below Hardware Gap; Claverty Cottage; J.P. 1416, 1421, Hart!

7. *A. laevigata* *Sw. Prodr.* 99 (1788) & *Fl. Ind. Occ.* 1166: shrub, glabrous, but puberulous on very young leaves, ovary, and capsule; leaves crenate-serrulate; inflorescence unisexual, female spike axillary; fruiting bracts many, 6 mm. l., cleft to below the middle into about seven lanceolate-linear lobes.—*Griseb. Fl. Br. W. Ind.* 48; *Muell. Arg. in DC. Prodr. xv. pt. 2*, 820. Type from Swartz in Herb. Stockholm and a specimen also in Herb. Mus. Brit.

Shakspear! in the western parts, *Swartz!* *Macfadyen!*; Christiana, Manchester, *Purdie!* *Wilson!*; Tyre, near Troy, 2000 ft.; slopes of Dolphin Head Mt.; Peckham, Clarendon, 2500-2800 ft.; Ipswich, St. Elizabeth, 500-750 ft.; *Harris!* Fl. Jam. 9470, 10,290, 10,862, 12,504.

Shrub 2-6 ft. high, glabrous (but puberulous on very young leaves, ovary, and capsule); monœcious. Leaves 5-8 (3-11) cm. l., lanceolate to narrowly elliptical, shortly acuminate, base cuneate, emarginate, margin crenate-serrulate, nerves pinnate, papery; petiole short, 2-7 mm. l. Spikes unisexual, axillary, to 8 or 10 cm. l., male and female spikes on young

wood, generally on same branch, the male usually on youngest wood, and sometimes as long as 17 cm. l.; male flowers dense, female several to 20 at intervals. *Male bracteoles* elliptical-oblong. *Female bracts* enclosing two flowers, white tinged (in dried plants) with purplish-red, about 2 mm. l., increasing to 6 mm. in fruit, divided to below the middle into lanceolate-linear lobes, the middle one longest. *Ovary* puberulous. *Styles* (in dried plants) purplish, pinnate with many branches. *Capsule* about 3 mm. l., puberulous.

8. A. pruinosa Urb. *Symb. Ant.* v. 388 (1908); shrub, glabrous; leaves crenate-serrulate; inflorescence unisexual, female spike axillary; fruiting bracts many, 8 mm. l., cleft about two-thirds of length into 4-7 oblong obtuse lobes.

Woods near Resource, Purdie! near Troy, 2000 ft.; Lapland, near Catacupa, 2000 ft.; Harris! Fl. Jam. 8738, 9175.

Shrub 8 ft. high, monœcious; glabrous. *Leaves* 9-15 (7-20) cm. l., 2-5 cm. br., narrowly elliptical, apex usually acuminate, base subcordate or obtuse, crenate-serrulate, pinnately nerved, papery; petiole 5-5 cm. l., glandular at the apex on the upper side; stipules ovate-lanceolate, reddish, somewhat thick, 5-7 mm. l. *Spikes* unisexual, male on branches more than one year old, female on branches less than one year old, male 3-10 (or more) cm. l., slender, female, 3-5 cm. l. *Female bracts* 1-flowered, 2-4 mm. l., increasing in fruit to 8 mm. l. *Capsule* about 2.5 mm. l., hirtellous.

9. A. jamaicensis Britton in *Bull. Torr. Bot. Club* xxxix. 7 (1912); shrub, with twigs, petioles, and inflorescence densely pubescent; leaves strongly serrate; inflorescence unisexual, female spike axillary; fruiting bracts many, 5 mm. l., divided about halfway into 5-9 oblong-ovate lobes.

Masson! Purdie! Leicesterfield, Clarendon, 1800 ft.; Toms Cave Wood, Clarendon, 2500 ft.; Harris! Fl. Jam. 10,842, 10,856.

Shrub 6-8 ft. high, monœcious. *Leaves* variable in size, 5-18 cm. l., 2-5.5 cm. br., elliptical-lanceolate or oblong-lanceolate, with a long slender acuminate point, base subcordate, nerves pinnate with 1 or 2 on each side from the base, membranous, sparingly pubescent on both sides, denser on nerves beneath, or glabrate above; petiole 1-4 cm. l.; stipules minute, soon falling. *Spikes*: male and female on same or different branches, male to 10 cm. l. (with peduncle 2 cm. l.), female 5-10 cm. l. (with peduncle 1.5-5 cm. l.). *Male bracts* linear, somewhat flat, hirtellous, 2-3 mm. l. *Female bracts* hirtellous on margin and on the prominent ribs, generally enclosing two flowers, one developing before the other. *Capsule* about 1 mm. l., hirtellous.

10. A. elliptica Sw. *Prod. 99* (1788) & *Fl. Ind. Occ.* 1168; shrub or tree, with twigs, petioles, and inflorescence puberulous or glabrous; leaves crenate-serrate; inflorescence axillary, unisexual, male and female on the same or different branches; fruiting bracts many, to 3 or 4 mm. l., transversely elliptical, somewhat cordate at base, margin uneven, shortly toothed.—*Griseb. op. cit.* 47; *Muell. Arg. tom. cit.* 812; *Urb. Symb. Ant.* v. 388. **A. hernandifolia** Sw. *Prod. 99* (1788) & *Fl. Ind. Occ.* 1162; *Griseb. loc. cit.*; *Muell. Arg. tom. cit.* 808; *Urb. loc. cit.* **A. villosa**

Griseb. loc. cit. (non *Jacq.*). A. Alexandri *Urb. tom. cit.* 387 (1908). Specimens from Swartz of *A. elliptica* and *A. heraudifolia* are in Herb. Stockholm, and of *A. elliptica* in Herb. Mus. Brit. Type of *A. Alexandri* is in Herb. Kew.

Wright! Broughton! Dancer; Shaksppear! Masson! Swartz! Purdie! Wilson! Ocho Rios; Union Hill and Pleasant Valley, Moneague; Prior! J.P. 1132, Morris! David's Hill; New Market, 1150 ft.; Harris! above Lucea, Mrs. E. G. Britton 2874! Fern Gully, Britton & Hollick 2692! Fl. Jam. 5123, 9838, 9841.

Plant 10-15 ft. high, monococious or dioecious. Leaves 6-15 cm. l., broadly ovate, ovate, ovate-elliptical, or elliptical, more or less acuminate, base rounded to subcordate, nerves pinnate with one on each side from the base which often reaches halfway up the limb, and sometimes with another marginal, membranous; petiole variable in length, 1-15 cm. l. Spikes 5-16 cm. l., 1·5-2·5 mm. in diam., female lax, with the bracts sometimes 1·5 cm. apart. Female bract with one flower. Capsule 3-lobed-globular, 1·5-2·5 mm. l., hispid. Seeds 1·5-1·2 mm. l., roundish-ovate-ellipsoidal, blackish.

15. ACIDOTON Sw.

Shrub or small tree, loosely branching; with stinging hairs especially on margin of leaves, calyx, and capsule, otherwise somewhat glabrous. Leaves alternate, entire, leathery, pinnate-nerved. Inflorescence axillary. Flowers monococious or dioecious, without petals, solitary in the axil of a bract. Male racemes shortened so that the flowers are clustered, flowers with long pedicels. Female racemes longer, pendulous, flowers solitary in the axil of a bract, distant along the rhachis. Disk none or not conspicuous. Male flowers: Sepals 3-5, valvate, reflexed in flower. Stamens numerous, indefinite, on a receptacle which is raised, cup-shaped above with fleshy walls in *A. urens*, fleshy and somewhat flat in *A. microphyllus*. Rudiment of ovary none. Female flowers: Sepals 5-6, imbricate, erect in flower. Ovary 3-celled; styles united at the base into a thick column, entire above or slightly 2-lobed; ovules solitary. Capsule splitting up into three 2-valved cocci. Seeds without a caruncle; endosperm fleshy; cotyledons flat, broad.

Species 2, one a native of Jamaica, the other of Hispaniola.

A. urens Sw. *Prod. 84* (1788) & *Fl. Ind. Occ.* 954; *Griseb. Fl. Br. W. Ind.* 45; *Muell. Arg. in DC. Prod. sv. pt. 2*, 914. *A. innocuus* Baill. *Étud. Euphorb.* 402, t. 18, f. 10, 11. *Urtica urens* arborea &c. *Cat. 38 & Hist. i.* 124, t. 83, f. 1. *Tragia subfruticosa* &c. *Browne Hist. Jam.* 336. (Fig. 99.)

Mountain Cowitch, Smooth leaved Cowitch.

Near Angels, Sloane Herb. ii. 701 Wright! Masson! Swartz! mts. in Westmoreland; near Hampshire, banks of Rio Cobre; Purdie! Angels; Moneague; Prior! March! Chapelton, J.P. 1513, Hart! Jackson Town, Miss A. Moulton-Barrett! near Troy, 1500-2000 ft.; Mocha road, Catadupa,

1500 ft.; Glasgow, near Troy, 1400 ft.; Malvern to Mountain Side, 400 ft.; Peckham, Clarendon, 2500 ft.; Tyre, near Troy, 2200 ft.; Harris! Fl. Jam. 8682, 8733, 9181, 9433, 9920A, 10,951, 12,643. Type from Swartz in Herb. Stockholm.

Shrub 5 to 15 ft. high; or slender *tree* 15 to 25 ft. high, branches with deciduous stinging hairs. *Leaves* 5-12 cm. l., in two rows on the branch, narrowly-elliptical or narrowly oblong-elliptical, apex acute or subacute, base obtuse, margin usually entire, sometimes with 1 or 2(-4) large teeth or small acute lobes, ciliate with pellucid stinging hairs, at length glabrate; petioles 3-6 mm. l.; stipules triangular, acute or acuminate, 4-5 mm. l. *Male flowers*: Pedicels 1-2 cm. l. Bracteoles about 4 mm. l.

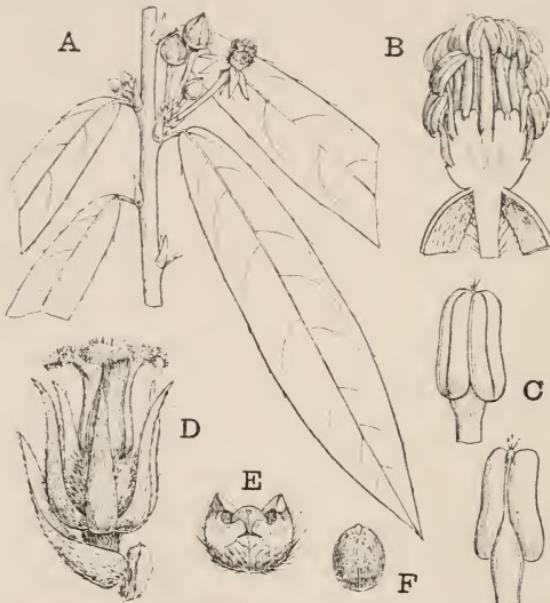


Fig. 99.—*Acidotton urens* Sw.

A, Part of branch with male inflorescence
 $\times \frac{2}{3}$.

B, Male flower cut lengthwise and sepals
 cut short $\times 4$.

C, Anthers, back and front $\times 10$.

D, Female flower $\times 4$.

E, Coccus, nat. size.

F, Seed $\times 1\frac{1}{2}$.

Sepals about 6 mm. l. *Anther-cells* parallel dehiscing outwards, connective terminated by a cluster of very short hairs. *Female flowers*: Pedicels 1-2 mm. l. *Bracteoles* 5-6 mm. l. *Sepals* about 5 mm. l., narrower than in the male. *Styles* bending outwards, covered on the inner side with white fleshy hairs. *Capsule* 1.5 cm. in diam., 6-7 mm. high, black, covered with white stinging hairs. *Seeds* globular, about .5 cm. in diam., brown with white spots.

16. TRAGIA L.

Climbing or twining perennial herbs or undershrubs, generally hispid or rough with hairs which are often stinging. Leaves alternate, toothed, often cordate, pinnate-nerved, with one or

two on each side at the base, with stipules. Flowers monœcious, without petals. Racemes axillary (in *T. volubilis*) usually with male and female flowers, the latter at the base. Flowers usually solitary in the axil of a bract. Male flowers: Calyx globose, closed in bud, valvately 3-(5-)parted in flowering. Disk none or obscure. Stamens 3, 2 or 1. Rudiment of ovary none or minute. Female flowers: Sepals usually 6, imbricate. Ovary 3-celled; styles 3, united into a column, undivided at the apex; ovules solitary. Capsule splitting up into three 2-valved cocci. Seeds without a caruncle; endosperm fleshy; cotyledons broad, flat.

Specimens over 100, widely dispersed through the tropics, and extending to South Africa and the southern states of North America.

T. volubilis L. *Sp. Pl.* 980 (1753) & *Amœn.* v. 382; *Sw. Obs. Bot.* 353; *Griseb. Fl. Br. W. Ind.* 48; *Muell. Arg. in DC. Prodr.* xv. pt. 2, 935; *Urb. Symb. Ant.* iv. 348; *Prain in Fl. Trop. Afr.* vi. pt. 1, 969. *T. scandens* &c. *Browne Hist. Jam.* 336. *Urtica* *racemosa* *scandens* &c. *Sloane Cat.* 38 & *Hist. i.* 123, *t.* 82, *f.* 1. (Fig. 100.) The type, a specimen grown in Hort. Upsal., is in Herb. Linn., also a specimen presumably from Browne.

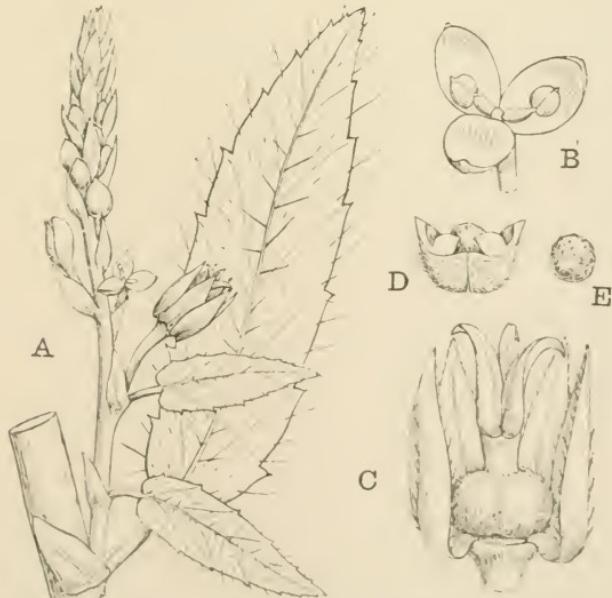


Fig. 100.—*Tragia volubilis* L.

A, Part of branch with foliage leaf and inflorescence $\times 3$.
 B, Male flower $\times 10$.
 C, Female flower with a sepal removed $\times 10$.
 D, Coccus $\times 2$.
 E, Seed $\times 2$.

Creeping or Twining Cowitch.

Near St. Jago de la Vega, and common elsewhere, Sloane Herb. ii. 72! *Houston!* Lane in Herb. Sloane clxii. 126! Browne! Wright! Broughton! Shaksppear! Masson! Distin! near Holland Bay, Purdie! Wilson! Mam mee Bay; Kingston; Prior! March! Port Morant, Hitchcock; Cherry Garden, Liguanea plain, Campbell; Hope grounds and river; near Browns Town, 1000 ft.; Round Hill, St. Cruz Mts.; Harris! Fl. Jam. 5832, 6770, 7058, 8234, 9697.—West Indies, Curaçao, tropical continental America. West Africa.

Shrub; branches trailing and twining over shrubs, armed with stinging hairs. *Leaves* 2–6 cm. l., oblong-lanceolate or oblong, base truncate-cordate or rounded, serrate, more or less hirsute with pellucid hairs, which soon drop off; petiole 5–3 cm. l.; stipules lanceolate, about 3 mm. l. *Racemes* slender, 3–7 mm. l.; bracts lanceolate, persistent, 1 mm. l., female sometimes lobed; male flowers numerous, female usually 1 (3–4); pedicels of male flower about 3 mm. l., jointed about halfway, of female flower continuing to grow until the capsule is ripe, looking like a branch of the raceme, 1.5–3 cm. l., jointed below the apex. *Male flowers*: *Calyx* about 1.2 mm. l. *Sepals* 3. *Female flowers*: *Calyx* about 2 mm. l. *Sepals* 6. *Ovary* hispid. *Capsule* 3.5 mm. high, about 7 mm. in diam., hispid with white hairs, deeply divided into 3 subglobular cocci. *Seeds* globular, 2.5 mm. in diam.

The root is looked upon as a good aperient and diuretic, and both the decoction and juice are frequently used for those purposes (Browne).

17. RICINUS L.

A tall annual glabrous herb, or in warm regions an arborescent shrub. Leaves alternate, peltate, palmately divided into seven or more serrate lobes. Stipules united to cover the bud. Flowers monœcious, without petals. Racemes more or less paniculate at the ends of branches, the lower flowers male, the upper female. Disk none. Male flowers: Calyx globose in bud, valvately 3–5-parted in flowering. Stamens very numerous with much branched filaments; anther-cells subglobose, separately attached to the connective. No rudiment of an ovary. Female flowers: Calyx splitting into the form of a spathe, falling very early. Ovary 3-celled; styles 2-cleft; ovules solitary in each cell. Capsule splitting up into three 2-valved cocci, spiny or smooth. Seeds with caruncle conspicuous.

Species 1, very widely spread throughout the warmer regions of the world, perhaps originally African, often cultivated.

R. communis L. Sp. Pl. 1007 (1753); Wright Mem. 230; Bot. Mag. t. 2209; Baill. Étud. Euphorb. t. 10, 11 & Hist. Pl. v. 110, 111, figs.; Griseb. Fl. Br. W. Ind. 37; Muell. Arg. in DC. Prodr. xv. pt. 2, 1017 & in Fl. Bras. xi. pt. 2, 420, t. 60; Bentl. & Trim. Med. Pl. t. 237; Urb. Symb. Ant. iv. 348; Hook. f. Fl. Brit. Ind. v. 457; Prain in Fl. Trop. Afr. vi. pt. 1, 945. *Ricinus americanus* fructu racemoso hispido Sloane Cat. 38, Hist. i. 126.

(Fig. 101.) Type in Herb. Linn. Specimens from Hort. Cliff. in Herb. Mus. Brit.



Fig. 101.—*Ricinus communis* L.

- | | |
|---|---|
| A, Upper portion of flowering branch $\times \frac{2}{3}$. | G, Ovary cut lengthwise to show ovule and obturator, much enlarged. |
| B, Male flower just before opening $\times 2$. | H, Capsule, nat. size. |
| C, Ditto open $\times 2$. | I, A coccus split open, nat. size. |
| D, Anther, much enlarged. | J, Seed, nat. size. |
| E, Female flower $\times 2$. | K, Ditto $\times 1\frac{1}{2}$. |
| F, Ovary cut across $\times 4$. | |

(A, E, F, H, after Bentley and Trimen; B, G, K, after Baillon.)

Cultivated and spontaneous; Sloane Herb. ii. 93! and Carp. Coll.! Lane in Herb. Sloane clxii. 121! Hope Gardens, Harris!—For distribution see under genus.

Leaves 1·5-6 dm. broad; petiole 1-3 dm. l. *Male flowers* 12-15 mm. in diam. *Female calyx* about 8 mm. l. *Capsule* 1·3-2·4 cm. l., ellipsoidal. *Seeds* flattish-ellipsoidal, 10-17 mm. l. (without the caruncle).

The seeds yield the castor-oil of commerce. The oil-cake is a valuable manure. See Barham, *Hortus Americanus*, 120, 144; Watt Comm. Prod. Ind.; Bull. Dept. Agri. Jamaica n.s. ii. 50 (1912).

[**MANIHOT** Adans.

Tall herbs or shrubs. Leaves alternate, with three to seven digitate lobes or segments, sometimes entire. Flowers large for the Family, monococious, without petals, one in axil of each bract, in racemes. Racemes terminal or in the upper axils, sometimes branching, lax, the upper flowers male, the female generally at the base of the raceme. Calyx often coloured, campanulate, with five imbricate lobes. Male flowers: Stamens 10, in two series, attached between the lobes or glands of the disk; anthers dorsifixed. Rudiment of ovary wanting or small, 3-lobed. Female flowers: Disk hypogynous. Ovary 3-celled; styles shortly united at the base, spreading, many-lobed; ovules solitary. Capsule splitting up into three 2-valved cocci. Seeds smooth, with large caruncle.

Species 128, all American, mostly Brazilian, a few dispersed through the tropical regions as far north as Mexico, one or two cultivated for many years in various tropical lands.

M. utilissima Pohl *Plant. Bras.* i. 32, t. 24 (1827); Muell. *Arg. in DC. Prodr.* xv. pt. 2, 1064 & in *Fl. Bras.* xi. pt. 2, 457, t. 65; Urb. *Symb. Ant.* iv. 350; Pax in *Engl. Pflanzenreich* iv. 147. ii. 67. M. Manihot Cockerell in *Bull. Torr. Bot. Cl.* xix. 95 (1892). *Jatropha Manihot* L. *Sp. Pl.* 1007 (1753); *Tussac Fl. Ant.* iii. t. 1; *Wright Mem.* 218. *Janipha Manihot* H. B. & K. *Nov. Gen. & Sp.* ii. 108 (1817); *Bot. Mag.* t. 3071; *Griseb. Fl. Br. W. Ind.* 37. *Manihot inodorum* &c. *Pluk. Phyt.* t. 205, f. 1. *Ricinus minor viticis* &c. *Sloane Cat.* 41, *Hist. i.* 130, t. 85. (Fig. 102.)

Cassava or Cassada, Tapioca, Manioc.

Sloane Herb. ii. 98, 99! cult., *Broughton!* cult., *Harris!* *Fl. Jam.* 5606, 7703, 7719. Cultivated throughout the tropics and in subtropical regions, e.g. Florida, Bermuda, probably indigenous in Brazil.

Root tuberous, elongated, full of starch, with juice which is sometimes bitter and poisonous. Shrubby, sometimes arborescent, 5-9 ft. high. Leaves deeply 3-7-parted, membranous, on upper surface glabrous, beneath glaucous and minutely puberulous or glabrous along the nerves; lobes 8-15 cm. l., lanceolate, entire; petiole generally longer than the leaf; stipules linear, acuminate, entire, 6-7 mm. l. Inflorescence branching from the base, primary branches 3-5 cm. l. Flowers glabrous except the apex of the connective which has a cluster of hairs. Male flowers: Calyx 5-cleft, glabrous outside, puberulous inside, 3-4 mm. l. Female flowers: Calyx 5-parted, 9-10 mm. l., glabrous. Ovary 6-ribbed, glabrous. Styles

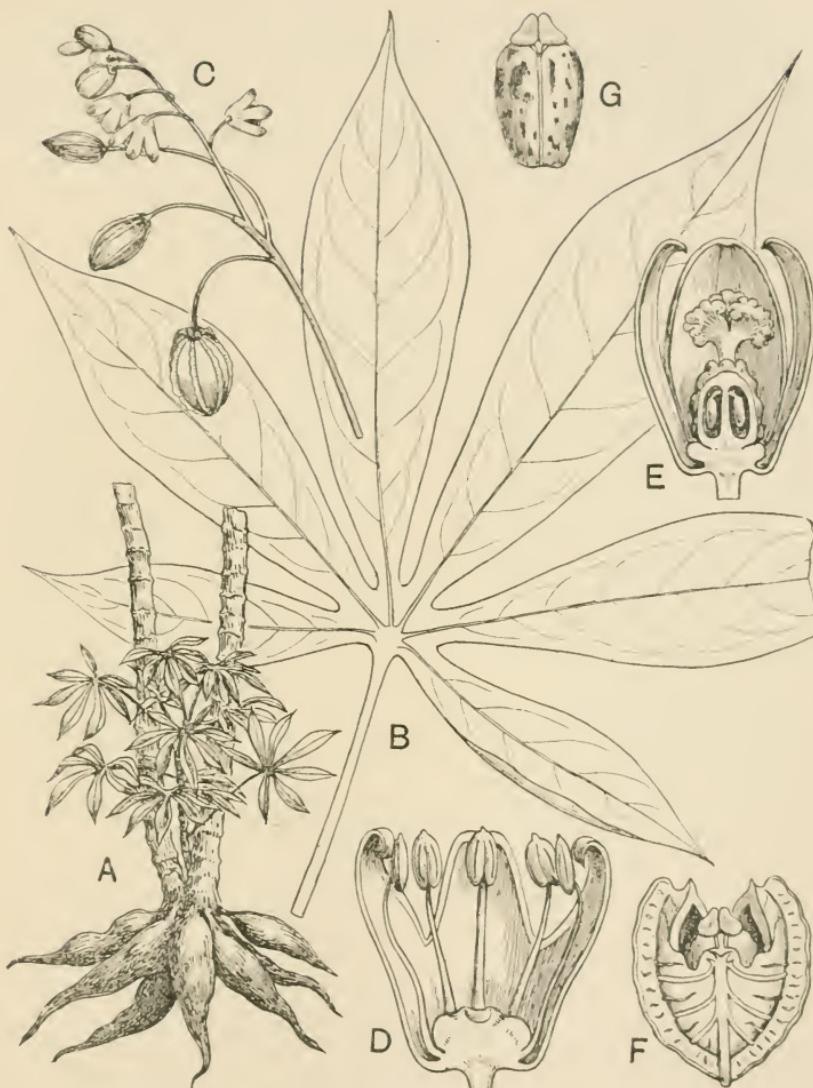


Fig. 102.—*Manihot utilissima*.

- | | |
|---|--|
| A, Lower part of stem showing young shoot and tubers, much reduced. | E, Female flower cut lengthwise $\times 2$. |
| B, Leaf, nat. size. | F, One carpel of the ripe fruit showing the seed, nat. size. |
| C, Portion of inflorescence $\times \frac{1}{2}$. | G, Seed, nat. size. |
| D, Male flower cut lengthwise $\times 5$. | |

(C-G, after Tussac.)

broadening out from the narrow base, and cut along the upper edge into numerous lobes. Capsule about 1.5 cm. l., broadly ellipsoidal, rough, narrowly winged. Seeds about 12 mm. l., grey mottled with dark splashes.

The tuberous roots may be roasted or boiled directly after digging, or, if kept longer, they are grated, and the juice squeezed out by pressure.

The material left in the press is pounded and dried on hot iron plates, forming cassava meal, which is made into cakes. Pure cassava starch is a valuable commercial article used in Manchester goods. Moistened and dried on hot plates it forms tapioca. The juice of the bitter cassava heated to get rid of the poisonous principle, is an antiseptic, the basis of many sauces, and boiled with peppers and meat forms "pepper-pot." See also Barham, Hortus Americanus, 34; Watt Dict. Econ. Prod. Ind. & Comm. Prod. Ind.; Bull. Bot. Dept. Jam. n.s. ix. 81 (1902); Bull. Dept. Agriculture, Jamaica i. 35 (1903), & n.s. i. 53, ii. 186.]

18. JATROPHA L.

Tall herbs, or shrubs, rarely arborescent. Leaves alternate, undivided or (sometimes in the same plant) digitately lobed or cleft; segments 3 to numerous, margin entire or wavy or pinnately lobed. Stipules small or cut up into threads. Flowers monococious, with petals in Jamaican species, numerous in terminal, corymb-like panicles regularly forked, the female flowers solitary in the primary forks. Male flowers: Calyx, segments or lobes 5, imbricate. Petals 5, contorted-imbricate, united into 5-lobed corolla, or distinct, or wanting if the calyx is petaloid. Disk entire or of five glands. Stamens 10 or fewer, attached to the receptacle in two or several series; filaments, at any rate the interior, more or less united into a column, the 5 exterior opposite the petals. No rudiment of an ovary. Female flowers: Calyx like that of the male. Petals present in Jamaican species, sometimes wanting in others. Ovary generally 2-3-celled; styles united at the base, divided each into two stigmatic lobes or branches; ovules solitary. Capsule splitting up into two or three 2-valved cocci. Seeds carunculate.

Species about 150, natives of the tropics, especially in America, but extending also into North America and southern Africa.

Inflorescence corymbose cymes.

- Leaves not lobed or slightly lobed, widely cordate 1. *J. curcas.*
- Leaves divided below the middle into 5-3 obovate-elliptical lobes 2. *J. gossypifolia.*
- Leaves with lanceolate lobed divisions reaching nearly to the base 3. *J. multifida.*
- [Leaves peltate, divided halfway or less into 3-6 roundish lobes *J. podagraria.*]]

Inflorescence repeatedly two-forked.

- Branches of fork diverging. Leaves not peltate 4. *J. divaricata.*
- Branches of fork not diverging. Leaves peltate 5. *J. hernandiaxifolia.*

1. *J. curcas* L. *Sp. Pl.* 1006 (1753) & *Amoen.* v. 383; leaves not, or slightly, lobed, roundish-ovate, apex acute, base widely cordate, entire, glabrous or sometimes puberulous at the base beneath, 5-1.5 dm. l., lobes acute to rounded; cymes corymbose,

usually shorter than the leaves, branching freely from the base or pedunculate, compact, many-flowered, more or less tomentellous, 1.5–1.5 dm. l.—Jacq. Hort. Vindob. iii. t. 63; Wright Mem. 219; Jussieu Euphorb. Tent. t. 11, f. 34A; Griseb. Fl. Br. W. Ind. 36; Muell. Arg. in DC. Prodr. xv. pt. 2, 1080 & in Fl. Bras. xi. pt. 2, 487, t. 68; Baill. Hist. v. 112, fig. 163–165; Cook & Coll. in

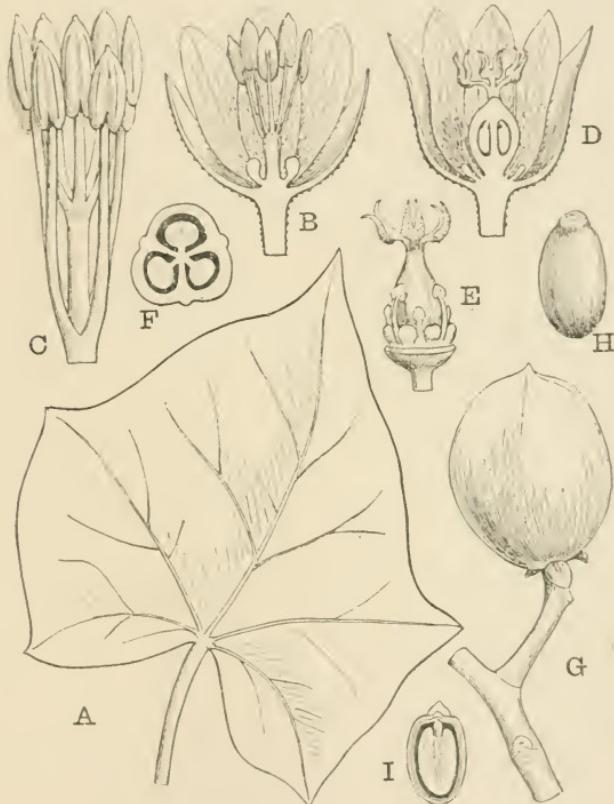


Fig. 103.—*Jatropha curcas* L.

- A, Leaf $\times \frac{3}{4}$.
- B, Male flower cut lengthwise, outer stamens removed $\times 3$.
- C, Stamens $\times 9$.
- D, Female flower cut lengthwise $\times 3$.
- E, Female flower with calyx and corolla removed $\times 3$.
- F, Ovary cut across, enlarged.
- G, Capsule $\times 5$.
- H, Seed $\times 7$.
- I, Seed cut lengthwise $\times 6$.

Contrib. U.S. Nat. Herb. viii. 171, t. 42; *Urb. Symb. Ant.* iv. 349; *Pax in Engl. Pflanzenreich* iv. 147. 77, fig. 30. *Ricinus, ficus folio &c.* *Sloane Cat.* 40 & *Hist. i.* 127. *J. assurgens, ficus folio &c.* *Browne Hist. Jam.* 348. (Fig. 103.) Type in *Herb. Linn.* Specimen from *Hort. Cliff.* in *Herb. Mus. Brit.*

Physic Nut.

Sloane Herb. ii. 94! *Houston!* *Lane & Pasmore* in *Herb. Sloane*

clxii. 122! Wright! Parnell! Moneague, Prior! Robertsfield, 3000 ft., Harris! Fl. Jam. 7666.—Bermuda, West Indies, tropical continental America, cultivated and subspontaneous in the tropics of the Old World.

Shrub, sometimes tree-like, 5–20 ft. high. *Trunk* to 3 dm. in diam., with copious milky juice. *Branches* stout, with chambered pith. *Petiole* 5–1·5 dm. l., with the branches glabrous. *Stipules* very rudimentary, tomentellous. *Bracts* lanceolate, 3–14 mm. l. *Male flowers*: *Calyx* 3·5–4·5 mm. l., sepals united at the base, narrowly elliptical. *Petals* 6·5 mm. l., elliptical, cohering as far as the middle, pubescent within. *Disk-glands* free. *Filaments* 9, five inner united halfway, four outer united at the base. *Female flowers*: *Calyx* like the male, but half as long again. *Petals* like the male, increasing with calyx in fruit. *Disk-glands* free. *Ovary* glabrous. *Styles* very short, with 2-lobed stigmas. *Capsule* fleshy on outside at first, with three or two cocci, 2·5–4 cm. l. *Seeds* blackish, oblong-ellipsoidal, about 2 cm. l.

This species is sometimes used as a hedge by small settlers, as slips grow quickly. The oil expressed from the seeds is purgative and emetic; it is applied in diseases of the skin. See Barham, Hortus Americanus, 141; Watt Comm. Prod. Ind.

2. *J. gossypifolia* L. Sp. Pl. 1006 (1753) & Amoen. v. 383; leaves divided below the middle into 5–3 lobes, base cordate, 5–14 cm. in diam., pubescent at the base on upper surface and sometimes on nerves on both surfaces, lobes somewhat obovate-elliptical with acute or subacuminate apex, margin puberulous and glandular; panicles 5–2 dm. l., branches bearing corymb-like cymes.—Wright Mem. 219; Sw. Obs. Bot. 366; Jacq. Ic. Pl. Rar. iii. t. 623; Bot. Reg. t. 746; Griseb. loc. cit.; Muell. Arg. in DC. Prodr. xv. pt. 2, 1086 & in Fl. Bras. xi. pt. 2, 491, t. 69, f. II; Urb. Symb. Ant. iv. 350; Small Fl. S.E. U.S. 706; Paxton. cit. 26; Hutchinson in Fl. Trop. Afr. vi. pt. 1, 783. *Ricinus minor* staphisagriæ folio &c. Sloane Cat. 41 & Hist. i. 129, t. 84. *Ricinus americanus* perennis &c. Commel. Amst. 17, t. 9. *Jatropha humilior* setis &c. Browne Hist. Jam. 348. Type in Herb. Linn.

Wild Cassada, Belly-ache bush.

Savannas everywhere, Sloane Herb. ii. 96, 97! and Carp. Coll. 7602! Houston! Lane in Herb. Sloane clxii. 123! Broughton! Distin; near Kingston, McNab! Parnell! Purdie! Spanish Town, Prior! King's House Grounds, J.P. 1325, Morris! near Kingston, Fawcett! also Clute! also Hitchcock; Windward road, Campbell! Alligator Pond; Quarry, Spanish Town; Harris! Fl. Jam. 6062, 6379, 6482, 6819.—Key West, Bahamas, West Indies, tropical continental America, and widely distributed in the tropics.

Shrub 2–3(–6) ft. high. *Petiole* as long as, or shorter than, the limb, bearing glandular branching hairs. *Stipules* cut into thread-like glandular segments, 3–5 mm. l. *Bracts* linear-lanceolate, glandular-ciliate, 5–1 cm. l. *Flowers* purple. *Sepals* acuminate, lanceolate in male, lanceolate to ovate in female, glandular-ciliate, pubescent outside, persistent in fruit, male 3–3·5 mm. l., female 4·5–5 mm. l. *Petals* free or slightly cohering at base, glabrous, elliptical narrowing to base, about 4 mm. l., of female deciduous. *Disk-glands* of male flower free, roundish, of female lobed. *Filaments* 10–12, united above the middle, many times longer than the anthers. *Ovary* puberulous. *Styles* slender, free; stigma 2-lobed. *Capsule* about 1 cm. l. and br., globular-oblong, truncate at both ends, slightly 3-furrowed, glabrous. *Seed* greyish-brown, slightly mottled, 7–8 mm. l.

Sloane says: "This is the most general [purgative] remedy of the poorer sort in the dry belly-ache; they take of the leaves from seven to twenty-one, and boil them, drinking the decoction." Poultry are fond of the seeds. See Barham, *Hortus Americanus*, 19.

J. multifida L. Sp. Pl. 1006 (1753) & Amoen. v. 383; leaves palmately deeply lobed, glabrous, lobes generally 11(-7), 1-1·5 dm. l., lanceolate, narrowed into a long tail at apex with 1-3(-5) smaller lobes on each side, much lighter and more or less pruinose beneath.—*Wright Mem. 219; Sw. Obs. Bot. 368; Salisb. Parad. t. 91; Griseb. loc. cit.; Muell. Arg. in DC. Prodr. xv. pt. 2, 1089 & in Fl. Bras. xi. pt. 2, 495, t. 69, f. I; Urb. Symb. Ant. iv. 350; Pax tom. cit. 40; Hutchinson tom. cit. 784. Ricinus americanus tenuiter &c. Breyn. Cent. 116, t. 53; Sloane Cat. 40 & Hist. i. 36. Manihot folio &c. Dill. Elth. 217, t. 173. J. assurgens foliis digitalis &c. Browne Hist. Jam. 348. Type in Herb. Linn.*

Spanish, or French Physic Nut.

(*Sloane*, Barbados, Herb. ii. 95! and Carp. Coll.!) *Browne!* *Wright!* *Liguanea, Broughton!* *Parnell!* *Lucea, Hitchcock*; cultivated and apparently indigenous in Jamaica and West Indies generally, continental tropical and subtropical America, cult. and subspontaneous in trop. Africa and S.E. Asia.

Small tree or shrub, 5-20 ft. high. *Branches* glabrous. *Leaves* palmately deeply lobed, glabrous; lobes generally 11(-7), 1-1·5 dm. l., lanceolate narrowed into a long tail at apex, with 1-3(-5) smaller lobes on each side, much lighter and more or less pruinose beneath. *Petiole* 1-2 dm. l., glabrous. *Stipules* cut into thread-like, glabrous segments, 1-2 cm. l. *Cymes* corymb-like, glabrous; peduncle 2-1 dm. l. *Bracts* linear-lanceolate, glabrous, 1·5-2·5 mm. l. *Pedicels* jointed at the apex. *Flowers* scarlet, glabrous. *Male flowers*: *Calyx* 2-2·5 mm. l.; segments about half as long, with rounded apex, of a pale coral colour. *Petals* 4-6 mm. l. *Disk* of five glands united at the base. *Filaments* 8, red, free to the base; anthers long. *Female flowers*: *Calyx* and *petals* as in male, petals to 6 or 7 mm. l. *Ovary* glabrous. *Styles* short, united in the lower half, with thick 2-lobed stigmas. *Capsule* yellow, with a longitudinal slight ridge on back of the cocci, 2-3 cm. l. and br. *Seeds* mottled, broadly ellipsoidal, about 2 cm. l.

See Barham, *Hortus Americanus*, 141.

[*J. podagraria* Hook. Bot. Mag. t. 4376 (1848); Muell. Arg. in DC. Prodr. xv. pt. 2, 1093; Pax tom. cit. 44.

Naturalized in waste places in the lowlands, cult. in Hope Gardens, Harris! Fl. Jam. 12,709.—Central America and northern S. America, also cultivated in many of the West Indian islands.

Stem, 1-1½ ft. high, and *branches* distorted, swollen at their bases, succulent, pale greenish-brown; trunk and branches marked with the scars of the fallen leaves. *Leaves* peltate, 3-6-lobed, base sometimes somewhat flattened, glabrous; 6-22 cm. in diam., only a few appearing at a time at the apex of the branches; petioles usually as long as the leaf; stipules with glandular fringe, persisting for some time after the fall of the leaf. *Cymes* compact, corymb-like; peduncle long. *Flowers* orange-scarlet, rather small, female solitary at the forks, male numerous at the ends of the branches. *Male flowers*: *Calyx* exceeding 2 mm. l., lobes rounded, about 7 mm. l. *Petals* oblong-elliptical, apex rounded, 7 mm. l.

Disk cup-shaped. *Stamens* 8-6; filaments free to base; anthers long, 3 mm. l. *Female flowers*: *Calyx* and *petals* like those of male. *Ovary* glabrous. *Styles* short with thick 2-lobed stigmas. *Capsule* about 1.5 cm. l., ellipsoidal. *Seeds* 12 mm. l., light-brown.]

J. panduræfolia Andr. *Bot. Rep.* iv. t. 267, a native of Cuba, is cultivated in gardens; it is a shrub about 6 ft. high, with fiddle-shaped leaves, and large, handsome, crimson flowers.

4. *J. divaricata* Sw. *Prodr.* 98 (1788) & *Fl. Ind. Occ.* 1158; *Griseb. loc. cit.*; *Muell. Arg. tom. cit.* 1077; *Pax tom. cit.* 74. Specimens from Swartz in *Herb. Mus. Brit.* and in *Herb. Stockholm*.

Wild Oil Nut.

Mountains in the west, *Swartz!* *Macfadyen!* *Cuming*; interior, St. Ann, *Purdie!* near Troy, 2500 ft.; Malvern, 2200 ft.; Peckham, Clarendon, 2000 ft.; *Harris!* *Fl. Jam.* 8715, 9738, 12,823.

Shrub or *tree*, 10-20 ft. high, the whole glabrous. *Leaves* ovate to elliptical, apex acute or subacuminate, base rounded, not lobed, entire, 2 basal nerves ascending not far from the margin, the rest nearly horizontal, papery, 7-14 cm. l.; petiole 3-7.5 cm. l.; stipules gland-like, deciduous. *Bracts* ovate, 1 mm. l. *Cymes* terminal and axillary, repeatedly two-forked, the branches of each fork equal and widely diverging; peduncle 3-10 cm. l.; flowers on the ultimate branches forming racemes. *Male flowers*: *Calyx* 2.5 mm. l., lobes ovate-rounded, 1 mm. l. *Petals* elliptical, about twice as long as the calyx. *Filaments* 8-10, united below; anthers mucronate at apex, 1 mm. l. *Female flowers* twice as long as the male, solitary in the fork at the base of the racemes. *Petals* cohering into a tube beyond the middle. *Ovary* glabrous. *Styles* very short; stigmas thick. *Capsule* somewhat globular; cocci 3, or 2, about 2 cm. l. *Seeds* 1 or 2 in each coccus, 14 mm. l., 9 mm. br., oblong-ellipsoidal.

5. *J. hernandiæfolia* Vent. *Jard. Malm.* i. 52 (1803); *Griseb. loc. cit.*; *Muell. Arg. tom. cit.* 1077; *Urb. Symb. Ant.* iv. 349; *Pax l. c.*

Bancroft!—Porto Rico, Hispaniola.

Shrub 6-12 ft. high. *Leaves* ovate, peltate, acuminate, base rounded-obtuse or truncate-subcordate or cordate, not lobed or the lower leaves 3-lobed, margin entire, wavy or with an occasional tooth, 7-9 cm. l.; petiole about as long. *Cymes* slender, repeatedly two-forked, about as long as the leaves. *Bracts* triangular, .5 mm. l. *Calyx* about 2 mm. l.; segments about 1 mm. l., elliptical, apex rounded. *Petals* white, about 4 mm. l., obovate-oblong, cohering to about the middle. *Disk-glands* 5, free. *Stamens* 10, variously united; anthers small, .5 mm. l., apiculate. *Ovary* glabrous. *Capsule* 1.5 cm. l.

[ALEURITES Forst.

Trees mostly with stellate hairs. Leaves alternate, long-stalked, large, 5-7-nerved at the base, 3-5-lobed or not lobed, with two glands at the top of the stalk. Flowers monoecious or subdioecious, with petals, in loose cymose panicles, repeatedly forked, at the ends of branches, the female flower solitary in the primary forks. *Calyx* globose, closed in bud, splitting valvately

into two or three lobes. Petals 5, longer than the calyx. Male flowers: Stamens 15–20 in the Jamaican species, attached to a conical receptacle; the five outer opposite the petals and alternate with small glands. No rudiment of an ovary. Female flowers: Ovary 2–5-celled, generally 2-celled in *A. moluccana*; styles as many as the cells, divided into two branches; ovules solitary. Fruit large, fleshy outside, indehiscent. Seeds without a caruncle; seed-coat thick, woody; endosperm thick, hard.

Species 4, natives of Eastern Asia and Polynesia, one of which (*A. moluccana*) is found also naturalized throughout the tropics.

A. moluccana Willd. *Sp. Pl.* iv. 590 (1805); *Muell. Arg. in DC. Prodr.* xv. p. 2, 723 & in *Fl. Bras.* xi. pt. 2, 304, t. 45; *Watt Dict. Econ. Prod. Ind.*; *Hook. f. Fl. Brit. Ind.* v. 384; *Urb. Symb. Ant.* iv. 348; *Pax in Engl. Pflanzenreich* iv. 147. 129. *Jatropha moluccana* L. *Sp. Pl.* 1006 (1753). *Aleurites triloba* Forst. *Char. Gen.* 112 (1776); *Griseb. Fl. Br. W. Ind.* 37. Type in Herb. Hermann in Herb. Mus. Brit.

Candle Nut.

Naturalized; Knowsley Park, 2550 ft., Miss Wood. Native of Malaya and Polynesia, naturalized in the tropics.

Tree 20–60 ft. Leaves simple or 3–5(–7)-lobed, the simple forms usually ovate, acute; lobes usually triangular, acute, 15–18 cm. l. (1–2·5 dm. l.); young leaves and twigs densely covered with stellate hairs. Panicles 1–1·5 dm. l. and br., tomentellous, with numerous white flowers. Male flowers: Calyx 3 mm. l. Petals 7–9 mm. l. Fruit 5–6 cm. in diam., olive-coloured, containing one or two large, hard seeds.

The root yields a brown dye. The seeds contain 50 per cent. of oil, which is "very fluid, of an amber colour, without smell, congealing at 32° F., insoluble in alcohol, readily saponifiable, and very strongly drying" (U.S. Dispens.). The oil is largely exported from Polynesia, and used in the candle trade; it is superior to linseed oil as a drying oil for paint, &c. Medicinally, a dose of half an ounce of the oil acts as a mild purgative; it also possesses a nutty flavour (Pharm. of India). The nuts are edible, tasting like walnuts, but should be eaten with caution. (See Watt Comm. Prod. Ind.)]

19. ACIDOCROTON Griseb.

Shrubs armed with straight diverging stipular spines, or unarmed. Leaves small, pinnately veined, obovate, thick, entire. Flowers few amongst the leaves, rather small, with very short stalks, monoecious, with petals. Male flowers: Calyx 5–6-cleft, spreading. Petals 5–7, larger than the calyx, spreading, contorted-imbricate. Stamens numerous, attached to a hairy disk-like receptacle; anther-cells distinct, attached to a rather broad connective. No rudiment of an ovary. Female flowers: Calyx like that of the male. Petals rudimentary. Ovary 3-celled; styles flat, spreading, thick, broadly obovate, retuse; ovules solitary. Capsule splitting into 2-valved cocci. Seeds rather large, with a white caruncle.

Species 2, one a native of Jamaica, the other of Cuba.

A. verrucosus Urb. *Symb. Ant.* vii. 513 (1913). (Fig. 104.)

Peckham Woods, Clarendon, Harris! Fl. Jam. 11,018.

Tree about 12 ft. high; branches ash-coloured, covered with minute warty excrescences, and bearing in the axils of the primary leaves cushion-like contracted branchlets covered with short spine-like stipules and the

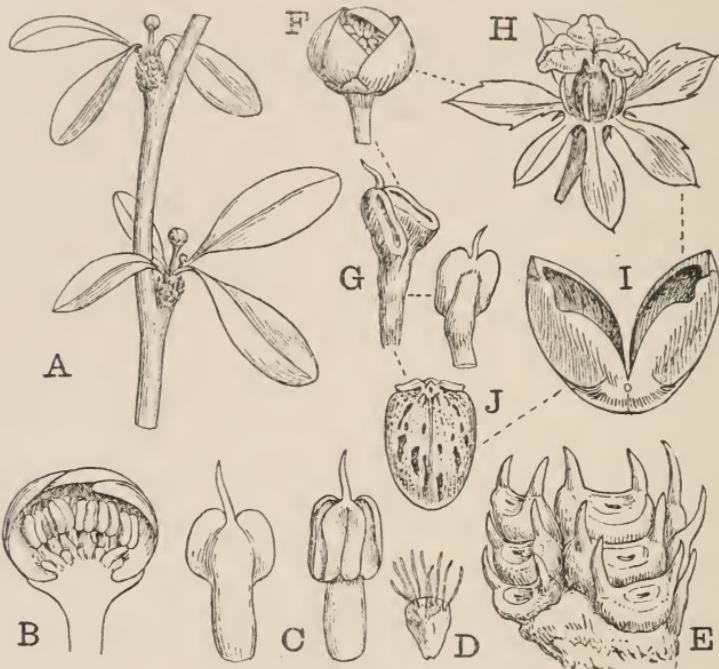


Fig. 104.—*Acidocroton*.

(A-E, *A. verrucosus* Urb.)

A, Part of branch showing cushion-like branchlets with male flowers $\times \frac{2}{3}$.

B, Male flower $\times 3$.

C, Stamens $\times 10$.

D, Obconical process between the stamens $\times 10$.

E, Part of a cushion-like branchlet, showing the scars of the fallen leaves and the stipules $\times 5$.

(F-J, *A. adelioides* Griseb.)

F, Male flower $\times 2$.

G, Stamens, back and front $\times 10$.

H, Female flower $\times 2$.

I, Coccus $\times 2$.

J, Seed $\times 2$.

bases of petioles. Leaves (on cushions) 1·5-2·5 cm. l., 5-9 mm. br., obovate-elliptical to elliptical-oblong, very obtuse at apex, narrowed below into the petiole, (when dry) papery, midrib on upper surface impressed, beneath prominent, nerves not conspicuous; petiole 3-5 mm. l.; stipules spiny, 1-2 mm. l. Male flowers only seen in bud, proceeding from the topmost cushion-like branchlets. Pedicels 3 mm. l. Sepals semioval or semiroundish. Petals 5, free, ovate-roundish. Stamens 20, inserted on a disk-like receptacle between obconical fleshy processes which are hairy on the apex; filaments free; anthers introrse, erect, with an awn at apex as long as, or half as long as, the anther.

20. TETRORCHIDIUM Poepp.

Trees or shrubs. Leaves alternate, with two glands at the top of the stalk. Flowers diœcious or monococious, without petals, in axillary racemes; male racemes long, with flowers small, sessile or subsessile, in clusters; racemes, with female flowers or male and female mixed, generally shorter, simple, or reduced to a single stalked female flower. Calyx 3-(4-)parted, segments

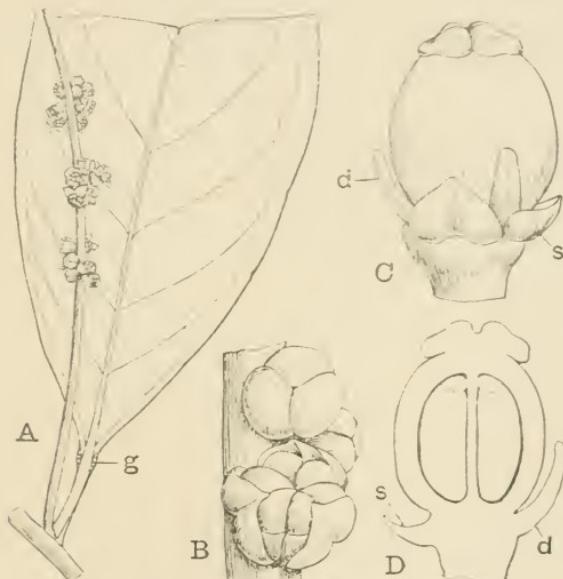


Fig. 105.—*Tetrorchidium rubrivenium* Poepp.

A, Portion of leaf and male inflorescence $\times \frac{2}{3}$; g, pair of glands.
B, Male flower and buds $\times 5$. C, Female flower $\times 5$; d, disk; s, sepal.
D, Ditto cut lengthwise $\times 5$; d, disk; s, sepal.

slightly imbricate. Male flowers: Disk none. Stamens 3, opposite to the segments of the calyx, united into a globular mass in the bud, at length scarcely free; anthers sessile, opening inwardly, 4-celled, 4-valved. Rudiment of ovary club-shaped, as long as the anthers, or minute. Female flowers (in *T. rubrivenium*): Disk consisting of three petal-like linear glands. Ovary 2-(3-)celled; stigmas 2, 2-lobed, sessile, spreading star-like; ovules solitary in each cell. Capsule splitting up into two or three 2-valved cocci. Seeds fleshy outside, not carunculate.

Species 4, natives of tropical America (including West Indies).

T. rubrivenium Poepp. Nov. Gen. & Sp. iii. 23, t. 227 (1845); Muell. Arg. in DC. Prodr. xv. pt. 2, 1133 & in Fl. Bras. xi.

pt. 2, 512, t. 71, fig. 2; Urb. Symb. Ant. iii. 303; Pax in Engl. Pflanzenreich iv. 147. iv. 31. (Fig. 105.)

Gum Wood.

Masson! Lindsay! Macfadyen! Purdie! Holly Mount, Mt. Diablo; Peckham, Clarendon, 2300 ft.; Red Hills, St. Andrew, 1000 ft.; Albion Pen, St. Ann; Harris! John Crow (Blake) Mts. Harris & Britton! Fl. Jam. 8505, 8991, 10,746, 11,085, 11,840, 12,009.—St. Vincent, central and tropical S. America.

Tree 15–50 ft. high. Leaves obovate- or oblanceolate-elliptical, apex bluntly apiculate or blunt, leathery-membranous, entire or wavy or slightly toothed, glabrous, with two glands at the junction with the petiole, 8–20 cm. l.; midrib prominent beneath, nerves slightly prominent on both sides, veins few, indistinct on upper surface, slightly prominent beneath; midrib, nerves and petiole tinged with red; petiole 5–2 cm. l. Male panicle 8–18 cm. l.; female raceme 2–4 cm. l. Male flowers green: Sepals broadly triangular-concave, midrib keeled inside, puberulous outside, pubescent inside, especially along the keel, 2 mm. l., 1·7 mm. br. Anthers puberulous, sessile. Female flowers: Sepals broadly triangular, puberulous, about 1 mm. l. Disk-glands 1·5 mm. l. Ovary 2-celled. Stigmas red (in Poeppig's plate), spreading close to the ovary. Capsule about 8 mm. l.

Purdie states that the gum of this tree is collected and spread on the branches of trees to catch parrots, &c.

21. CHÆTOCARPUS Thw.

Trees or shrubs. Leaves alternate, entire, leathery, with stipules. Flowers dioecious, without petals, pubescent, clustered in the axils, or forming a terminal inflorescence by reduction of the leaves. Disk short, ring-like, or irregularly lobed. Male flowers minute: Calyx irregularly 3–5(-8)lobed, segments imbricate. Stamens indefinite, springing at different levels from a central column. Ovary rudimentary, terminating the central column, entire or 2–3-lobed. Female flowers: Calyx as in the male. Ovary 3-celled; styles 3, distinct, 2-cleft; ovules solitary. Capsule globular, densely covered with tubercles or spines, splitting up into three cocci with 2-cleft valves. Seeds with a large caruncle; coat black, shining; endosperm fleshy; cotyledons flat, broad.

Species 8, natives of the tropics in West Indies, South America, Africa, Ceylon and India.

C. globosus Fawc. & Rendle in Journ. Bot. lvii. 312 (1919). Croton globosum Sw. Prodr. 100 (1788) & Fl. Ind. Occ. 1181. Ricinus globosus Willd. Sp. Fl. iv. 567 (1805). Mettenia globosa Griseb. Fl. Br. W. Ind. 43 (1859); Muell. Arg. in DC. Prodr. xv. pt. 2, 1255; Pax in Engl. Pflanzenreich iv. 147. iv. 12. (Fig. 106.) Specimens from Swartz in Herb. Mus. Brit.

“High mts. of southern Jamaica,” Swartz! Macfadyen! Morce’s Gap, Purdie! Cinchona woods, J.P. 1196, 1273, Hart! road to Newton; Morce’s Gap, 5000 ft.; Harris! Fl. Jam. 5308, 9112.

Tree to 30 ft., or shrub 4–5 ft. Youngest portions of twigs puberulous.

Leaves 2·5-4 cm. l., roundish-ovate to roundish-elliptical, rounded or very obtuse at both ends, glabrous, shining; petioles 2-4 mm. l. Flowers clustered in the axils of the upper reduced leaves forming a terminal raceme leafy at the base. Pedicels: male 2 mm. l., female to 6 mm. l. Male flowers: Calyx about 2 mm. l., irregularly 4-5 parted, densely puberulous. Disk, lobes about as many as the stamens, conical. Stamens 6-7, the outer included, the inner higher, rising beyond the calyx; filaments

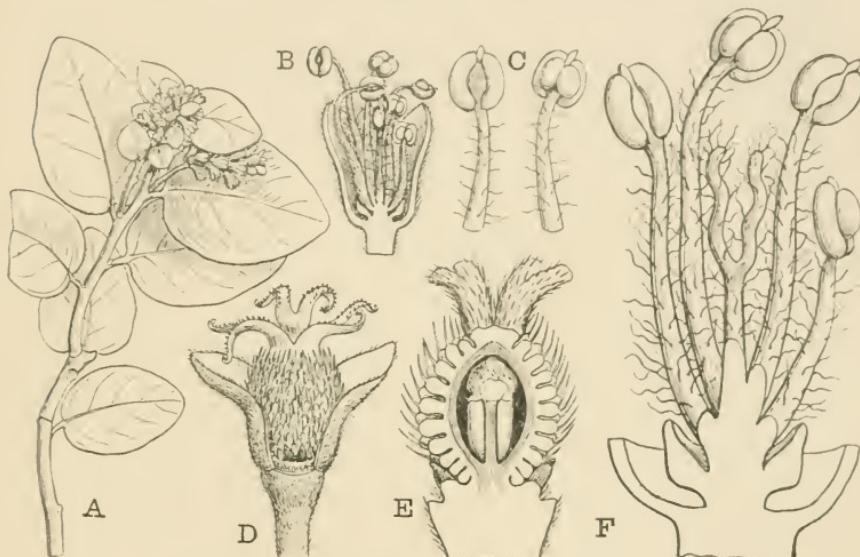


Fig. 106.—*Chætocarpus globosus* Fawc. & Rendle.

A, Upper part of branch with female inflorescence $\times \frac{1}{2}$.

D, Female flower with a sepal removed to show a 2-parted lobe of the disk $\times 5$.

E, Ovary cut lengthwise, showing ovules and obturator $\times 6$.

F, Male flower cut lengthwise with sepals removed $\times 10$.

B, Male flower cut lengthwise $\times 5$.

C, Stamens, showing back and front $\times 10$.

(of various lengths) and column villose. Anther-cells attached separately to the connective which is produced slightly beyond them, oblong-curved, each with a smaller cell on the concave surface. Central column slender, tapering, nearly as long as the calyx. Female flowers: Calyx 2-2·3 mm. l., irregularly 4-cleft, densely puberulous. Disk, lobes 4, 2-parted, opposite the sepals. Capsule 11-12 mm. l. Seeds remaining for long attached to the 3-winged columella.

22. OMPHALEA L.

Trees, or twining or climbing shrubs. Leaves alternate, with two glands at the apex of the petiole, entire, pinnate-nerved, often 3-5-nerved at the base, with stipules small, soon falling. Flowers monoecious, without petals, in small cymes which are altogether male or with the central flower female, disposed along the branches of a terminal panicle. Bracts subtending, the cymes on the axis of the panicle somewhat leaf-like. Disk

obscure or wanting. Sepals 4-5, broad, very imbricate. Male flowers: stamens 2-3; filaments united into a very short column; connective of the anthers thick, broad, united into a peltate cap-shaped mass 2- or 3-lobed at the margin, the anther-cells situated on the periphery near the margins of the lobes. Rudiment of ovary none. Female flowers: Ovary (2-)3-celled; style thick, column-like, obtuse or very shortly (2-)3-lobed; ovules solitary. Fruit thick, 2-3-carpous, fleshy outside, with a hard indehiscent endocarp, or at length splitting up into 2-valved cocci. Seeds subglobular, without a caruncle.

Species 15, of which one is a native of Madagascar, one of Australia, one of the Philippines, the rest tropical American (including the West Indies).

Leaf narrowed to base; anthers 3; ovary glabrous..... 1. *O. triandra*.
Leaf, base cordate; anthers 2; ovary tomentose..... 2. *O. diandra*.

1. *O. triandra* L. *Syst. ed.* 10, 1264 (1759), & *Amaen. v.* 408, 382; glabrous; leaves narrowed towards the base; anthers 3; ovary glabrous.—*Lodd. Bot. Cab.* t. 519; *Jussieu Euphorb. Tent.* t. 17, f. 58; *Baill. Étud. Euphorb.* t. 7, f. 6-9; *Griseb. Fl. Br. W. Ind.* 50 (in part); *Muell. Arg. in DC. Prodr.* xv. pt. 2, 1136; *Pax in Engl. Pflanzenreich* iv. 147. v. 16; *Guppy Plants &c. W. Indies*, 226. *O. nucifera* Sw. *Prodr.* 95 & *Obs. Bot.* 351, t. 10, f. 6; *Lunan Hort. Jam.* i. 203. *O. frondosa* Muell. *Arg. tom. cit.* 1137; *Pax loc. cit.* *Omphalandria foliis obovatis &c.* *Browne Hist. Jam.* 335, t. 22, f. 4. *O. triandra* *Kuntze Rev. Gen. ii.* 609 (1891).

Cob-nut, Pop-nut.

Port Antonio and Manchoneal, *Browne*; *Wright!* *Broughton!* *Shakspear!* *McNab!* *Wilson!* J.P. 1030, *Morris!* near Mandeville, *Fawcett!* Castleton, *Thompson!* also *Harris!* road from Askenish to Dolphin Head, 1200 ft.; *Hope, Harris!* Fl. Jam. 7308, 9272, 11,926.—Hispaniola.

Tree 30-45 ft. high. *Leaves* 1-3 dm. l., broadly or narrowly obovate-elliptical or oblong, usually narrowed at the base, usually with a nerve on each side of the base parallel with the margin; petiole 3-5 cm. l., glands at apex disk-like. *Bracts* much longer than the petioles, 6-15 cm. l., linear-spathulate, narrowed petiolar towards the base, the petiolar part longer than the blade, at length dropping off. *Anthers* 3. *Ovary* glabrous, ovoid, acuminate. *Capsule* 3.5 cm. high, about 7.5 cm. in diam., endocarp hard, wooden, thick, exocarp thin. *Seeds* globular, about 2.5 cm. in diam. *Pharmacosycea jamaicensis* Liebm. (in *Bidensk. Selsk. Skrift.* ii. 331 (1851)) is referred by Urban (*Symb. Ant.* vi. 99) and Pax l.c. to this species. We have not seen the specimen which was collected by Oersted near Kingston. Liebmann's description contains no reference to flower or fruit.

The timber of this tree is of no service in building, being of a soft brittle nature. The kernels of the nuts in the raw state are delicately sweet and wholesome; they are produced in great abundance, and, when ripe, they burst from the pod and fall to the ground. When roasted, they are equal, if not superior, to chestnuts. By compression they yield a very sweet and fine-flavoured oil. The cotyledons are emetic and purgative.

As this tree is of quick growth, bears fruit in three or four years, and succeeds very well in the poorest soils, it is well worthy of extensive cultivation (Lunan).

2. *O. diandra* L. *Syst. ed.* 10, 1264 (1759) & *Amen. v.* 382; tomentose-pubescent on youngest parts of branches, under surface of leaves, petioles, and inflorescence; leaves, base cordate; anthers 2; ovary tomentose.—*Aubl. Pl. Guian. ii.* 843, *iv. t.* 328; *Rich. in Sagra Cub. xi.* 206; *Baill. Étud. Euphorb.* 529, *t. 7, f. 1-5*; *Griseb. loc. cit.*; *Muell. Arg. tom. cit.* 1135 & in

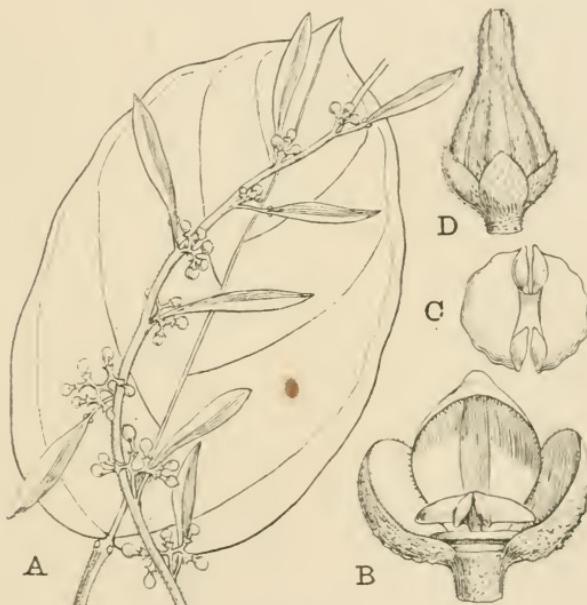


Fig. 107.—*Omphalea diandra* L.

A, Leaf and inflorescence $\times \frac{1}{2}$.
B, Male flower.

C, Stamen seen from above.
D, Female flower.

(B-D enlarged.)

Fl. Bras. xi. pt. 2, 515, t. 72; Pax tom. cit. 20. O. cordata Sw. Prodr. 95 (1788) & Obs. Bot. 350 (1791). Omphalandria frutescens &c. Browne Hist. Jam. 334. O. diandra Kuntze loc. cit. (Fig. 107.)

Port Antonio; Manchionel; Browne; rocky places, Swartz; Dancer!—Cuba, St. Kitts, Guadeloupe, St. Vincent, Trinidad, Panama, Guiana, Brazil, Para, Peru.

Shrub trailing and climbing high into trees, tomentose-pubescent on youngest parts of branches, under surface of leaves, petioles, and inflorescence. Leaves 9-17 cm. l., broadly elliptical, elliptical-ovate, or roundish-ovate, apex shortly cuspidate-acuminate, base cordate with one or two nerves on each side at the base; petioles 3-5 cm. l. Inflorescence usually long with long side branches. Bracts variable in length, 1-7 cm. l.,

pétiole part shorter than blade with two glands at apex. Anthers 2. Ovary tomentose. Capsule as large as an orange. Seeds 4·5 cm. l. and br., 3 cm. thick, obtusely convex on the back, very obtusely keeled on the ventral side, flat on the inner face (Muell. Arg.).

23. DENDROCOUSINSIA Millsp.

Small trees or shrubs. Leaves alternate, opposite or whorled, shortly petiolate or sessile, entire, or with small teeth, leathery or papery-leathery, pinnate-veined. Spikes terminal, or terminal axillary, solitary or clustered. Flowers dioecious, without petals,

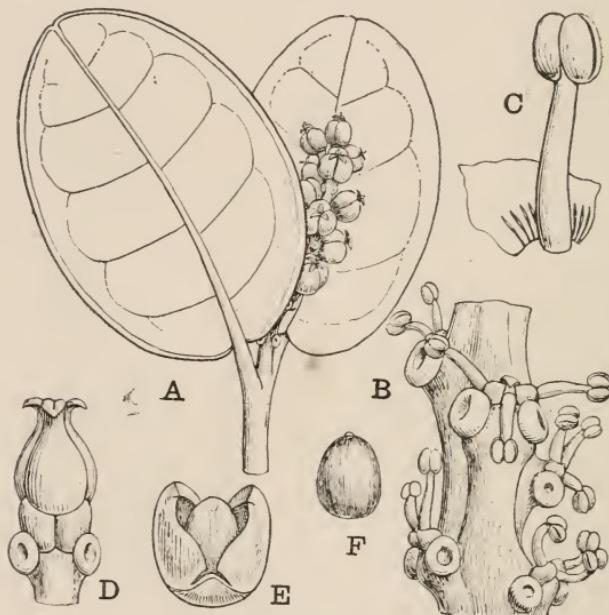


Fig. 108.—*Dendrocousinsia spicata* Millsp.

A, End of branch with leaves and female inflorescence $\times \frac{3}{5}$.

B, Part of male inflorescence $\times 5$.

C, Stamen with sepal and glandular fringe $\times 10$.

D, Female flower $\times 5$.

E, Coccus with seed $\times 2$.

F, Seed $\times 2$.

small, solitary in the axil of each bract; male sessile, female sessile or subsessile. Bracts very short, with a gland on each side. Disk represented by a fringe of small glandular hairs. Male flowers: Sepals small, distinct, membranous, open before flowering. Stamens 3; filaments free; anther-cells distinct, parallel, contiguous, opening longitudinally, attached at the base to the filament. Rudiment of ovary wanting. Female flowers: Calyx 3-parted or 3-lobed. Ovary 3-celled; styles 3, united very shortly below, or free, spreading or revolute above; ovules

solitary in each cell. Capsule subglobular, 3-furrowed, breaking up into 2-valved cocci leaving a central axis. Seeds oblong, smooth, carunculate.—*Fawc. & Rendle in Journ. Bot. lvii.* 313 (1919).

Species 3, natives of Jamaica.

Leaves petiolate.

- | | |
|---|----------------------------|
| Leaves 3·5–8 cm. l., elliptical. Male spikes terminal | 1. <i>D. spicata</i> . |
| Leaves 2·5–3·5 cm. l., ovate. Male spikes mostly axillary | 3. <i>D. alpina</i> . |
| Leaves sessile, 3–9 cm. l., ovate | 2. <i>D. fasciculata</i> . |

1. *D. spicata* Millsp. in *Field Columb. Mus. Bot. ii.* 374 (1913); *Fawc. & Rendle loc. cit.*; leaves petiolate, 3·5–8 cm. l., elliptical, rounded or emarginate at both ends, margin distinct, revolute; inflorescence terminal; female inflorescence 2–3·5 cm. l., with a cup-shaped gland at each side of the bract. (Fig. 108.) Type in Field Museum.

On limestone rocks, Peckham, Clarendon, 2500 ft., Harris! Fl. Jam. 10,980, 10,981, 11,204, 12,777.

Shrub or tree, 9 to 15 ft. high, glabrous. Leaves 3·5–8 cm. l., elliptical, rounded or emarginate at both ends, marginal portion distinctly marked and sometimes revolute, margin entire, with glandular points like undeveloped teeth, leathery, midrib prominent beneath; petioles 3–6 mm. l.; stipules represented by disk-like glands. Bracts with a fleshy cup-shaped gland on each side. Male spikes to 10 cm. l., somewhat thick. Male flowers sessile. Stamens spreading. Female inflorescence 2–3·5 cm. l. Female flowers subsessile; pedicels 1–4 mm. l. Calyx-lobes fleshy, sometimes with glands. Styles recurved at apex. Capsule 7–8 mm. in diam., 7 mm. high, dark brown, smooth. Seeds 4 mm. l., dark grey.

2. *D. fasciculata* Millsp. in *Field Columb. Mus. Bot. ii.* 375 (1913); *Fawc. & Rendle loc. cit.*; leaves sessile, 3–9 cm. l., ovate, sometimes elliptical or oblong, obtuse at both ends; female inflorescence terminal, a sessile cluster surrounded by three clustered leaves, with a prong-like gland at each side of the bract. Type in Herb. New York Bot. Gard.

Dolphin Head, 1800 ft., Harris! Fl. Jam. 10,266.

Tree 15 ft. high, glabrous. Leaves 3–9 cm. l., sessile, ovate, sometimes oblong or elliptical, obtuse at both ends, entire, papery-leathery, midrib prominent beneath, venation prominent, alternate below, opposite and three in a cluster on flowering branches. Female inflorescence a sessile cluster surrounded by three clustered leaves. Female flowers sessile or subsessile. Calyx about 2 mm. l., sepals 3, very broadly ovate, blunt lobes, closely adpressed to the ovary, fleshy especially below. Styles united at the base, spreading, recurved. Male flowers and fruit not seen.

3. *D. alpina* Fawc. & Rendle loc. cit.; leaves petiolate, 2·5–3·5 cm. l., ovate, sometimes elliptical, obtuse at both ends; male inflorescence terminal and axillary at nodes from which the leaves have dropped. Type in Herb. Jam.

John Crow Peak, Blue Mts., 6000 ft., Harris! Fl. Jam. 12,906.

Tree 18 ft. high, glabrous. Leaves 2·5–3·5 cm. l., ovate to elliptical,

obtuse at both ends, margin with a few small teeth, somewhat revolute when dry, without glands, papery-leathery, nerves and veins net-veined on upper surface, midrib prominent beneath but venation indistinct; petioles about 4 mm. l.; stipules roundish-deltoid, about 1 mm. l. *Inflorescence*, male with about twenty bracts, terminal and axillary at nodes from which the leaves have dropped, female not seen. *Bracts*: male, roundish-ovate, minutely toothed. *Male flowers*: Sepals roundish-rhomboid-ovate, margin irregular, minutely toothed. *Bracts and sepals* deep crimson.

24. SAPIUM Jacq.

Trees or shrubs, glabrous, with milky juice. Leaves alternate, entire or obscurely denticulate, nerves (in Jamaican species) almost at right angles to midrib, with or without 2 glands at

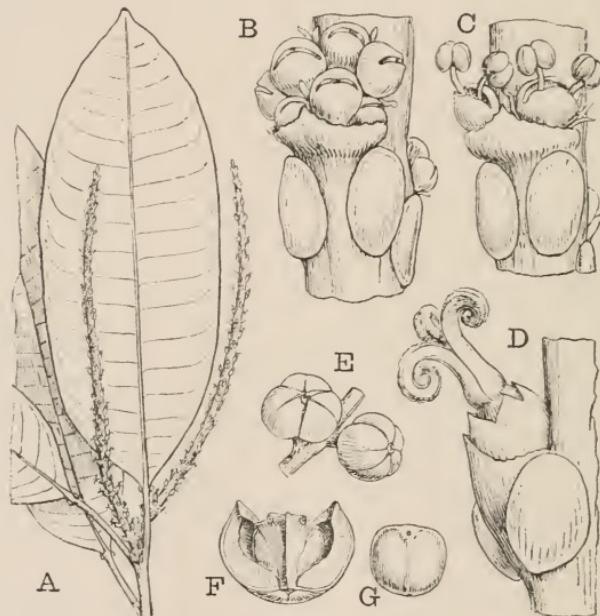


Fig. 109.—*Sapium jamaicense* Sw.

A, Leaves and inflorescence $\times \frac{1}{2}$.

B, Part of spike with young male flowers $\times 5$.

C, Ditto with male flowers $\times 5$.

D, Ditto with female flower $\times 5$.

E, Capsules, nat. size.

F, Coccus with columella and seed $\times 2$.

G, Seed $\times 2$.

the apex of the petiole, with stipules. Flowers monoecious, without petals, in terminal or lateral spikes or racemes. Male flowers generally three in axil of each bract along the upper part of the spike, which at length falls off; female, solitary in axil of each bract, several in the lower part of the spike, or one only, or none. Bracts often with glands on each side at the base. Disk wanting. Male flowers: Calyx small, shortly and unequally

2-3-toothed or -lobed. Stamens 2 or 3; filaments free; anthers globose. Rudiment of ovary wanting. Female flowers: Calyx 3-toothed or generally 3-cleft. Ovary 2-3-celled; styles 3(-2), distinct or united below, recurved-spreading, not divided; ovules solitary in each cell. Capsule globular or pear-shaped, more or less fleshy or pulpy, ultimately splitting into three 2-valved cocci; columella 3-winged. Seeds not carunculate.

Species nearly 100, widely dispersed through the tropics.

Leaves oblong-elliptical; petioles with glands 1. *S. jamaicense*.
Leaves elliptical-obovate; petioles without glands.

Ovary sessile or subsessile; styles united only at base 2. *S. cuneatum*.

Ovary stalked; styles united halfway 3. *S. Harrisii*.

1. *S. jamaicense* Sw. *Adnot. Bot.* 62 (1829); leaves oblong-elliptical or elliptical; petiole with small sessile oblong glands; spikes in axils of topmost leaves at apex of branch; ovary sessile.—*Urb. Symb. Ant.* iii. 308; *Huber in Bull. Herb. Boiss. sér. 2, vi.* 347, f. 2; *Hemsley in Hook. Ic. Pl.* t. 2889; *Pax in Engl. Pflanzen-reich iv.* 147. v. 205. *S. laurifolium* Griseb. *Fl. Br. W. Ind.* 49 (1859). *S. laurocerasus* var. *ellipticum* and var. *laurifolium* Muell. Arg. in *Linnæa xxxii.* 116 (1863). *S. arboreum* foliis &c. Browne *Hist. Jam.* 338. Hippomane 2-glandulosa Sw. *Obs. Bot.* 370 (1791) (non L.). Stillingia *laurifolia* Rich. in *Sagra Cub. xi.* 201, t. 69 (1850). Exccocaria *laurocerasus* var. *elliptica* and var. *laurifolia* Muell. Arg. in *DC. Prodr.* xv. pt. 2, 1203 (1866). (Fig. 109.) Specimen from Swartz in *Herb. Mus. Brit.*

Gum Tree, Milk Wood.

Wright! Shakspear! Swartz! Macfadyen! Moneague, Prior! Metcalfe! J.P. 943, Morris! Lapland, near Catahdupa, 1200 ft.; Golden Valley, near Castleton, 600 ft.; road to Guava Ridge, 2200 ft.; Stanmore Hill, 2200 ft.; Rio Minho Valley, 1000 ft.; Harris! Bachelor's Hall, 150 ft., Harris & Britton! Fl. Jam. 9165, 9194, 9195, 9562, 9971, 10,713, 10,882, 10,883.—Cuba, Hispaniola, Central America, Colombia.

Tree 30-60 ft. high. Leaves 7-22 cm. l., oblong-elliptical or elliptical, apex rounded, abruptly and shortly acuminate, base obtuse to wedge-shaped, margin entire or wavy or obscurely denticulate, papery; nerves numerous (to thirty on each side), about 2 mm. apart, bending upwards near margin, prominent; petiole 2-4 cm. l., glands small, sessile, oblong. Spikes 2-4, in axils of topmost leaves at apex of branches, to 15 cm. l. Bracts somewhat roundish with two elliptical glands; bracteoles fringed. Male flowers 3-7 in axil of each bract: Calyx 2-(3-)lobed. Stamens two. Female flowers: Calyx 3-toothed. Ovary 3- (2-)celled. Styles at length circinate. Capsule globular, 7-8 mm. in diam. Seeds about 4 mm. l., roundish-lens-shaped, roughly net-veined.

The tree yields a thick sticky resin, formerly used for boiling-house lamps, also used for bird-lime. The wood is soft and coarse. (Browne)

2. *S. cuneatum* Griseb. *Fl. Br. W. Ind.* 49 (1859); leaves elliptical-obovate; petiole without glands; spikes in axils of leaves; ovary sessile or shortly stalked; styles two or three, very shortly united at base.—*Pax in Engl. Pflanzenreich iv.* 147.

v. 235. *Excoecaria cuneata* Muell. Arg. in DC. Prodr. xv. pt. 2, 1208 (1866).

Macfadyen; *Purdie*; *Moneague, Prior!* March; Potsdam, 2600 ft.; Croft's Mt., Clarendon, 2500 ft.; *Harris!* Fl. Jam. 9817, 11,214.

Tree to 40 ft. high, glabrous. *Twigs* with scars of fallen leaves. *Leaves* 8–15 cm. l., elliptical-obovate, apex rounded or apiculate, base wedge-shaped, margin entire, sometimes bearing glands and usually two above the base of the limb, papery; nerves not more than about twenty on each side, 4–8 mm. apart, slightly prominent; petiole 1–2 cm. l., without glands; stipules roundish-ovate. *Spikes* numerous, in the axils of leaves, 5–7 cm. l. *Bracts* ovate or triangular, with small teeth, longer than the glands and covering the female calyx. *Male flowers*: *Calyx* 2-lobed, red. *Stamens* two; anthers red. *Female flowers*: *Calyx* 3-lobed. *Ovary* glabrous. *Styles* 2–3, only very shortly united at base. *Capsule* somewhat more than 1 cm. in diam. *Seeds* ellipsoidal, about 8 mm. l., red.

3. *S. Harrisii* Urban ex Pax in Engl. Pflanzenreich iv. 147. v. 236 (1912); leaves narrowly elliptical-obovate; petiole without glands; spikes in axil of leaves; ovary stalked; styles two, united halfway.

Hardware Gap, Blue Mts., 4000 ft., *Harris!* Fl. Jam. 10,117.

Tree to 60 ft. high, glabrous. *Twigs* with scars of fallen leaves. *Leaves* 10–17 cm. l., elliptical-obovate, apex rounded or shortly apiculate, base wedge-shaped, margin entire, revolute, sometimes bearing glands, leathery; nerves not more than about twenty on each side, 6–10 mm. apart, inconspicuous; petiole 2–3 cm. l., without glands; stipules like those of *S. cuneatum*. *Spikes*, female only seen, axillary, 6–8 cm. l. *Bracts* very broad, truncate, with a somewhat cup-shaped gland at each side. *Flowers* dioecious. *Female flowers*: *Sepals* two, broadly triangular, 1·2–1·5 mm. l. *Ovary* stalked, stalk about 3 mm. l., glabrous, 2-celled. *Styles* two, united halfway; free part recurved. *Capsule* (fide Pax) unripe, ovoid, acute.

25. GRIMMEODENDRON Urb.

Trees or shrubs, glabrous. Leaves alternate, obscurely toothed or serrulate. Spikes terminal, slender, 2-sexual. Bracts without glands. Flowers monococious, without petals. Male flowers subsessile, two or a few in the axil of each bract; female one or two at the base of the spike, sessile, solitary in the axil of each bract. Disk wanting. Male flowers: Calyx with three valvate lobes. Stamens three; filaments united into a column almost its whole length. Rudiment of ovary wanting. Female flowers: Calyx 3-cleft. Ovary 3-celled. Styles united below, free above, recurved, undivided. Ovules solitary in each cell. Capsule globular, splitting up into 2-valved cocci, the central columella persistent, 3-winged above. Seeds ovate-globular without a caruncle, marked near the hilum as if part of the skin had been scraped off.

Species 2, one a native of Jamaica, the other of the Bahamas and Cuba.

G. jamaicense Urb. *Symb. Ant.* v. 399 (1908), *fig.* n, o; *Pax in Engl. Pflanzenreich* iv. 147. v. 258, *fig.* 50, n, o.

Near Troy, 2000-2200 ft.; Mulgrave, St. Elizabeth, 1300 ft.; Harris! Fl. Jam. 9413, 9437, 12,380.

Tree 40-50 ft. high. Leaves 7-17 cm. l., obovate-, or oblanceolate-elliptical, apex truncate, emarginate, rounded, or sometimes very shortly acuminate, base wedge-shaped, margin more or less minutely toothed, nerves and veins slightly prominent and net-veined on both sides, somewhat leathery; petioles 1-2 cm. l. Spikes 12-17 cm. l., peduncle 1-2.5 cm. l. Bracts truncate, semilunar, without glands. Male flowers several in axil of each bract. Calyx .7 mm. l. Female flowers: Calyx about 1.5 mm. l. Styles united one-third to one-half the length. Capsule 10-12 mm. l., ovate-globular.

We have seen male flowers in bud only, in which there is no union of the filaments; the seeds also are immature and do not show the "area derasa." The examination of adequate material might prove this species to belong to *Sapium*.

26. HIPPOMANE L.

A glabrous tree with copious milky juice which is very poisonous and acrid. Leaves alternate, long-stalked, with a large orbicular dark red gland at top of petiole. Flowers monoecious, without petals, in terminal spikes. Bracts distant from one another, with a peltate gland on each side at the base. Male flowers, three to many, in the axil of each bract, female solitary (or rarely with male flowers) in the axil of the lowest one or two bracts or wanting, rarely associated with male flowers in the same bract. Disk wanting. Male flowers: Calyx small, with 2-3 imbricate short lobes. Stamens two (occasionally three); filaments united into a column, at length shortly exserted, very shortly free at the apex. Rudiment of ovary wanting. Female flowers: Calyx small with three segments. Ovary with 6-9 cells; styles united at the base, above free, linear, undivided, spreading star-like; ovules solitary in each cell. Drupe rather large, not splitting open, with thick flesh, endocarp very thick, bony, with several cells. Seeds not carunculate.

Species 1, native of Florida and Keys, Bahamas, Cayman, West Indies, Curaçao, Mexico to Venezuela.

H. Mancinella L. *Sp. Pl.* 1191 (1753) & *Amoen.* v. 382; *Mill. Gard. Dict. ed. 8*; *Sw. Obs. Bot.* 369; *Lun. Hort. Jam.* i. 482; *Jussieu Euphorb. Tent.* 90, t. 16, f. 54; *Baill. Étud. Euph.* t. 6, f. 12-20; *Griseb. Fl. Br. W. Ind.* 50; *Muell. Arg. in DC. Prodr.* xv. pt. 2, 1200; *Sarg. Silv.* vii. 35, t. 310; *Small Fl. S.E. U. States* 705; *Cook & Coll. in Contrib. U.S. Nat. Herb.* viii. 161; *Urb. Symb. Ant.* iv. 351; *Pax in Engl. Pflanzenreich* iv. 147, v. 262, with *fig.* 51. **H. mançanilla** Jacq. *Enum. Pl. Carib.* 31, *Sel. Stirp. Amer.* 250, t. 159 (1763), & *Ed. pict.* 121, t. 238. *Arbor americana* *Mancinello* &c. *Pluk. Phyt.* t. 142, f. 4.

Juglandi affinis &c. *Sloane Cat.* 129 & *Hist. ii.* 3, *t.* 159. *Malus americana* &c. *Commel. Amst. i.* 131, *t.* 68. *Mançanilla* &c. *Plum. Gen.* 49, *t.* 30; *Catesby Nat. Hist. Carol. ii.* *t.* 95.

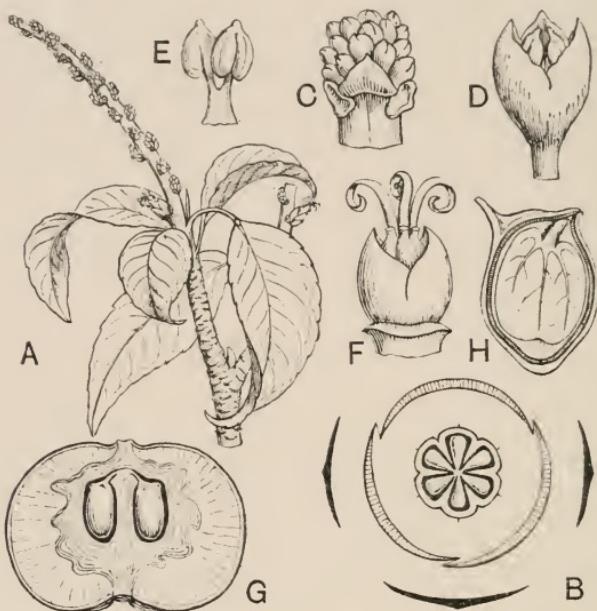


Fig. 110.—*Hippomane Mancinella* L.

- | | |
|---|--|
| A, Part of branch with leaves and in- | E, Stamens. |
| florescence $\times \frac{2}{3}$. | F, Female flower with three styles cut |
| B, Diagram of female flower. | off $\times 3$. |
| C, Cluster of male flowers $\times 3$. | G, Fruit, nat. size. |
| D, Male flower just opening. | H, Seed cut lengthwise. |
| (D, E, H much enlarged.) | |

Hippomane arboreum &c. *Browne Hist. Jam.* 351. *Mancinella venenata* *Tuss. Fl. Ant. iii.* 21, *t.* 5 (1824). (Fig. 110.) Type in *Herb. Linn.*

Manchineel.

Between Two Mile Wood and the Town savanna, *Sloane Herb. v. 55!* *Houston!* Port Morant, *Purdie!* coast between Portland Point and Rocky Point; Castleton; *Harris!* *Fl. Jam.* 10,189.—Distribution of genus.

Tree 12–60 ft. high, trunk 6 inches to 3 ft. in diameter, with bark $\frac{1}{2}$ – $\frac{1}{2}$ inch thick. *Leaves* 2·5–10 cm. l., elliptical or elliptical-ovate, apex acute or cuspidate, base rounded, truncate, or slightly cordate; usually nerves and veins prominent and conspicuously net-veined above, less so beneath. *Rhachis* of *spikes* 4–15 cm. l., dark purple. *Male flowers*: *Calyx* about 1 mm. l. *Female flowers*: *Calyx* 2·5–3 mm. l. *Styles* dark-red. *Fruit* about 3 cm. in diam., somewhat globular, yellow with reddish cheek when ripe. *Seeds* about 4 mm. l.

Sloane states that large boards are sawn from the trunk of this tree, not only for wainscot and cabinets, but even for the largest tables, this wood being much coveted by all people for its polish, durability, and delicate and various colours. *Browne* adds, “to guard against its corrosive

juices, the woodcutters are obliged to make a fire round the body of every tree some time before they can venture to fell them"; they burn the bark off, and so get rid of the acrid sap. Also see Barham, Hortus Americanus, 99.

27. GYMNANTHES Sw.

Trees or shrubs, glabrous. Leaves alternate entire or crenate-serrulate. Flowers monoecious, without sepals or petals, racemose. Racemes or spikes axillary, sometimes also terminal, solitary or clustered, often 2-sexual. Bracts ovate, enclosing the flowers in bud, sessile on a short peduncle, sometimes glandular outside at the back or at the sides. Male flowers solitary, or 2-7 together, in the axil of a bract : female flowers solitary in the axil of a bract, one or two at the base of the raceme, or several in a distinct raceme. Disk wanting. Male flowers: each usually subtended by one or two bracteoles (sepals of some authors), soon falling. Stamens 2-4; filaments free or united. Rudiment of ovary wanting. Female flowers: bracteoles (sepals of some authors), 2-4. Ovary sessile or stalked, 3-celled; styles distinct, or united half-way or only at the base, recurved, undivided; ovules solitary in each cell. Capsule splitting up from the persistent axis into three 2-valved cocci. Seeds generally carunculate.

Species 12, natives of the West Indies, of which one is also found in Brazil, and one in Florida, while three species are found only in Mexico.

Leaves oblanceolate, obovate, obovate-elliptical. Male
bracts 3-flowered.

Apex of leaves obtuse. Ovary stalked above the
bracteoles, long pedunculate 1. *G. lucida*.

Apex of leaves abruptly and shortly acuminate.

Ovary sessile, shortly pedunculate 4. *G. integra*.

Leaves ovate to oblong-lanceolate, acuminate. Male
bracts 5 (3-7)-flowered.

Ovary sessile, not pedunculate 2. *G. glandulosa*.

Leaves roundish elliptical to lanceolate-elliptical. Male
bracts 1-flowered.

Ovary sessile, with peduncle not longer than ovary ... 3. *G. elliptica*.

1. *G. lucida* Sw. *Prodr.* 96 (1788); leaves 3-9 cm. l., oblanceolate, or oblong-obovate, or even obovate-elliptical, apex obtuse, leathery, shining on upper surface, nerves and veins prominently net-veined on the upper surface; bracts broadly ovate, without glands, male 3-flowered; filaments free; ovary stalked above the bracteoles, with a long peduncle increasing in fruit.—*Sarg. Silv. rii.* 30, t. 309; *Pax in Engl. Pflanzenreich* iv. 147, r. 82; *Small Fl. S.E. U.S.* 703; *Urb. Symb. Ant.* iv. 352 (1905). *Ateramnus foliis oblongis, &c.* *Browne Hist. Jam.* 339 (?). *Excoecaria lucida* Sw. *Fl. Ind. Occ.* 1122 (1800); *Jussieu Euphorb. Tent.* t. 16,

f. 55; Nutt. *Sylv.* ii. 60, t. 61; Griseb. *Fl. Br. W. Ind.* 50. *Sebastiania lucida* Muell. Arg. in DC. *Prodr.* xv. pt. 2, 1181 (1866). (Fig. 111.)

Crab Wood.

Wright! Broughton! Macfadyen! Hills behind Ferry, Purdie! March! Stony Hill, J.P. 1106, Hart! Liguanea plain, Campbell! Grove, near Gordon Town, 800 ft.; Long Mt., 800-2500 ft.; Round Hill, St. Cruz Mts., 1500 ft.; Lititz savanna, 300-900 ft.; Harris! Fl. Jam. 5905, 6364, 6439, 8643, 8858, 8948, 9605, 9706, 11,768.—Florida and Keys, Bahamas, Cuba, Hispaniola, Porto Rico, St. Thomas, St. Cruz, St. Jan, Tortola, St. Eustatius, Antigua, Guadeloupe.

Shrub or tree 6-15(-30) ft. high. Leaves 3-9 cm. l., oblanceolate or oblong-obovate, or even obovate-elliptical, apex obtuse, subentire or

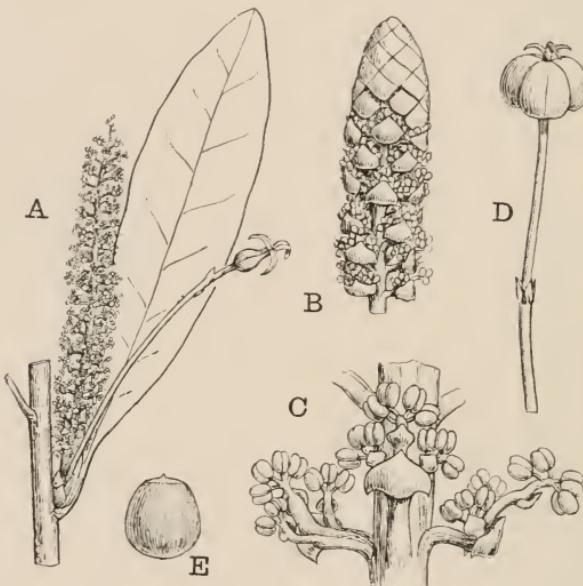


Fig. 111.—*Gymnanthes lucida* Sw.

- | | |
|---|--------------------------------------|
| A, Leaf and inflorescence, nat. size. | bracts and the male flowers in their |
| B, Upper part of a young inflorescence, | axils, enlarged. |
| enlarged. | |
| C, Part of inflorescence with three | D, Capsule, nat. size. |
| | E, Seed X 2. |

slightly crenate-serrulate, with or without one or two glands near the base beneath, leathery, shining on upper surface; nerves and veins prominently net-veined on the upper surface; petiole 5-10 mm. l. Flowers monœcious. Spikes 1-3 cm. l., 2-sexual or male, terminal and axillary, dense-flowered. Bracts broadly ovate, male 3-flowered, about 1 mm. l. Male flowers: each subtended by a bracteole (sepal of some authors), soon falling. Stamens in the middle flower 3-4, in the lateral 2-3; filaments free. Female flowers: Bracteoles (sepals of some authors) scale-like, minute, scarcely 1 mm. l., not all springing from the same level. Ovary stalked above the bracteoles; stalk short in the flower but continuing to grow to 1.5 or 2 cm. l. in fruit; pedicel in flower about 7 mm. l., growing to 2.5 or 3 cm. l. in fruit. Styles united for about half their length. Capsule

7 mm. l., about 1 cm. in diam., 3-lobed-globular, more or less net-veined on surface. Seeds 4-5 mm. in diam., globular, dark brownish; caruncle flat, circular, white, about 2 mm. in diam.

The wood is heavy, hard, close-grained, and susceptible of receiving a beautiful polish. It is rich dark brown streaked with yellow, with thick bright yellow sapwood. A cubic foot of absolutely dry wood weighs nearly 68 lbs. In Florida it is occasionally manufactured into canes. (Sargent)

2. *G. glandulosa* Muell. Arg. in *Linnæa* xxxii. 106 (1863); leaves 3-7 cm. l., ovate to oblong-lanceolate, acuminate, membranous, net-veined more or less prominently especially beneath: inflorescence male and female terminal, springing from wood of the same year, monœcious; bracts: male transversely oblong, sessile on a short peduncle, with a swelling extending up from the peduncle on the back, with one or two groups of minute glands near the apex of the peduncle, with 5-(3-7) flowers; filaments as long as or somewhat shorter than the anther, united almost or quite to the apex; female flowers sessile above the bract; ovary sessile above the bracteoles.—*G. jamaicensis* Urb. *Symb. Ant.* vii. 516 (1913). *Excoecaria glandulosa* Sw. *Fl. Ind. Occ.* 1124 (1800). *Actinostemon jamaicensis* Britton in *Torr. Bot. Club* xxxix. 7 (1912). *Ricini fructu glabro*, arbor &c. *Sloane Cat.* 131 & *Hist. ii.* 7, t. 158, f. 2.

Gully between Town savanna and Two Mile Wood, *Sloane Herb.* v. 57! *Wright!* *Swartz!* Grants Pen, near Albion Estate, Yallahs Bay, *Harris & Harris!* *Fl. Jam.* 10,643, 10,818, 10,826, 10,936.

Tree 20-30 ft. high. Leaves crenate-serrulate, rarely with one or two glands at apex of petiole beneath; petioles slender 5-1 cm. l. *Stipules* 2-4 mm. l., linear-acuminate, soon falling. *Inflorescence* terminal, male only, with about twenty bracts, or male with one sessile female flower at base, or one or two female flowers on a separate spike. *Male flowers*, each with or without one or two lanceolate acuminate bracteoles (sepals of some authors). *Stamens* 2, rarely 3. *Female flowers*: *Bracteoles* (sepals of some authors) 3. *Styles* united below, free above. *Capsule* (only valves seen) apparently slightly larger than that of *G. integra*. *Seeds* somewhat like those of *G. integra*, but globular, darker in colour, and somewhat smaller, 3-3 mm. br.; caruncle wanting.

3. *G. elliptica* Sw. *Prodr.* 96 (1788); leaves 2.5-10 cm. l., roundish-elliptical to lanceolate-elliptical, somewhat leathery. shining on upper surface, nerves and veins more or less prominent on the upper surface; bracts small, transversely elliptical, with a large fleshy gland on each side, male 1-flowered: filaments very short, free; ovary sessile above the bracteoles: peduncle as long as, or shorter than the ovary, not increasing in fruit.—*Pax tom. cit.* 86. *Excoecaria tinifolia* Sw. *Fl. Ind. Occ.* 1119 (1800); *Griseb. op. cit.* 51. *Sebastiania elliptica* Muell. Arg. in *DC. Prodr. loc. cit.* (1866). Specimens from Swartz in *Herb. Mus. Brit. & Herb. Stockholm*.

Swartz! *Bertero!* *Macfadyen!* St. Cruz Mts.; Guava Ridge; *Purdie!* Moneague; Liguanea Hills; *Prior!* March; near Cinchona, J.P. 948,

1199, 1355, Green Valley, J.P. 1407, Robertsfield J.P. 1408, *Morris!* Liguanea plain, 650 ft., *Campbell!* also *Britton*; Ramble, St. Anns, 1700 ft., *Fawcett & Harris!* Sheldon; Grove, near Gordon Town, 800 ft.! Long Mt., 900 ft.; Quarry near the Ferry; Peckham, Clarendon, 2500 ft.; Crofts Mt., Clarendon, 2500 ft.; Lititz Savanna, 300-900 ft.; *Harris!* John Crow (Blake) Mts., *Harris & Britton!* Kingston, *Britton!* Fl. Jam. 5095, 5754, 6240, 7023, 8644, 8946, 8947, 10,387, 10,757, 11,173, 11,182, 11,210, 11,213, 11,215, 11,224, 11,769.

Shrub or tree 6-30 ft. high (sometimes a large forest tree). Leaves 2·5-10 cm. l., roundish-elliptical to lanceolate-elliptical, entire or occasionally very bluntly glandular-serrulate, without glands at the base, somewhat leathery, shining on upper surface; nerves and veins more or less prominulous on the upper surface; petiole 1-10 mm. l. Flowers described as dioecious, but certainly sometimes monococious, male green, anthers yellow. Male spikes 3-9 cm. l., solitary or 2-3 together in axils of leaves, sessile or shortly stalked. Bracts small, transversely elliptical, with a large fleshy gland on each side, 1-flowered, united to the short peduncle. Bracteoles (sepals of some authors) 2, unequal. Stamens 2 or 3; filaments short. Female racemes 1-2 cm. l., lax-flowered, axillary, 5-7-flowered. Bracts broad, with a gland on each side, 1-flowered. Pedicel 2-4 mm. l., not increasing in length in fruit. Bracteoles (sepals of some authors) 3-4. Ovary sessile above the bracteoles. Styles shortly united below, free parts recurved. Capsule 5-6 mm. l., 7-8 mm. in diam., 3-lobed-globular. Seeds about 5 mm. l., about 3 mm. br., ellipsoidal, greyish-black; caruncle flat, white, about 1 mm. in diam.

4. *G. integra nom. nov.*; leaves 4·5-9 cm. l., obovate-elliptical to elliptical, abruptly and shortly acuminate, leathery, nerves slightly prominent especially beneath, veins somewhat indistinct especially beneath; bracts: male roundish, broader than long, not glandular, or sometimes slightly swollen at base with a minute lateral gland, 3-flowered, uppermost with 1 flower, female roundish-ovate with two groups of several minute pinkish stipular glands; filaments united at base; ovary sessile on the bracteole, shortly stalked above, the bract, not increasing in fruit.—*Gymnanthes glandulosa Pax in Engl. Pflanzenreich iv. 147. v. 83 (1912) non Muell. Arg. Excoecaria glandulosa Griseb. Fl. Br. W. Ind. 51 (1859) (non Sw.). Sebastiania glandulosa Muell. Arg. in DC. Prodr. xv. pt. 2, 1186 (1866).*

Near Browns Town; limestone hills, St. Anns; *Prior* 857! *March* 1459! Dolphin Head, 1800 ft.; Crofts Mt., Clarendon, 2500 ft.; *Harris!* Fl. Jam. 10,159, 11,225.

Tree 15-30 ft. high. Leaves 4·5-9 cm. l., obovate-elliptical to elliptical, abruptly and shortly acuminate, base rounded or subcordate to wedge-shaped and unequal-sided, margin entire, revolute, without glands, leathery, nerves slightly prominent especially beneath, veins somewhat indistinct especially beneath; petioles 3-8 mm. l., thick. Inflorescence apparently dioecious, male with several bracts, to 15, axillary, female with 1 or 2 flowers, terminal. Bracts: male roundish, broader than long, not glandular or rarely slightly swollen at base with a minute lateral gland at base, 3-flowered, uppermost bracts with 1 flower; female roundish-ovate, with 2 groups of several minute pinkish glands in the place of stipules. Male flowers each with or without 1 dentate bracteole (sepal of some authors). Stamens 3(-4). Filaments much shorter than the anthers,

united at the base. *Female flowers* shortly stalked above the bract. *Bracteole* broader than long, minutely toothed. *Ovary* sessile above the bracteole. *Styles* long, recurved, united at the base only. *Capsule* about 7 mm. l. *Seeds* ellipsoidal globular, 4 mm. l., 3·5 mm. br., buff-coloured with irregular brown or black blotches; *caruncle* yellow, like a minute pin's head.

28. HURA L.

Trees. Leaves alternate, broad. Flowers monœcious, without petals. Male spikes terminal with crowded flowers, solitary to each bract. Bracts enclosing the bud, splitting irregularly during flowering. Female flowers solitary in the uppermost



Fig. 112.—*Hura crepitans* L.

A, Upper part of flowering branch with leaves and inflorescence, nat. size.
B, Staminal column and anthers.
C, Ovary cut lengthwise showing ovules and obturators.

D, Capsule, about one-half nat. size.
E, Coccus.
F, Seed cut lengthwise.

(B, C, F enlarged.)

axils or under the male spike. Disk none. Male flowers: Calyx wanting or forming a more or less complete rim or cup, margin irregular or toothed. Stamens 8-20; filaments united with the connectives into a column; anther-cells distinct, attached in 2-4 or 8-10 whorls on the outside of the column below the top. Rudiment of ovary none. Female flowers: Calyx broadly cup-shaped, truncate, entire. Ovary 5-20-celled; styles united into a long fleshy column, funnel-like above and spreading star-like at the top; ovules solitary in each cell. Capsule large, depressed in the centre, splitting up with a loud report and scattering the numerous 2-valved cocci. Seeds laterally compressed, lens-shaped, without caruncle; endosperm fleshy; cotyledons broad, flat.

Species 2, natives of tropical America.

H. crepitans L. Sp. Pl. 1008 (1753); Lam. Illustr. t. 793; Descourt. Fl. Ant. ii. t. 124; Tussac Fl. Ant. iv. 21, t. 5; Griseb. Fl. Br. W. Ind. 50; Baill. Étud. Euphorb. 542, t. 6, f. 21-35; Muell. Arg. in DC. Prodr. xv. pt. 2, 1229 & in Fl. Bras. xi. pt. 2, 632, t. 86; Urb. Symb. Ant. iv. 352; Pax in Engl. Pflanzenreich iv. 147. v. 274, f. 55; Prain Fl. Trop. Afr. vi. sect. 1, 1019. Hippomane arboreum ramulis &c. Browne Hist. Jam. 351. (Fig. 112.) A specimen from Browne in Herb. Linn. named by Linnaeus.

S a n d b o x T r e e .

Browne! Macfadyen! Purdie! Mt. Diablo Prior! Harris! Fl. Jam. 8383.—West Indies, tropical continental America; cultivated and sometimes naturalized in the tropics of the Old World.

Tree 30-80(-100) ft. high; branches spiny or unarmed. Leaves 5·3 dm. l., roundish-ovate, abruptly and shortly acuminate, base cordate or rounded, entire, or obscurely or conspicuously wavy-toothed, more or less pubescent on the nerves beneath, densely so at base of midrib, papery-membranous; petiole as long as, or longer than the limb or sometimes shorter; stipules lanceolate, 1-1·5 cm.l., soon falling. Spike, male bright red, 3-5 cm. l.; peduncle 5-11 cm. l. Anther-cells usually in 2 whorls. Female flower dull red, subsessile, or peduncle to 2 cm. l. Ovary with style at length 3-4(-5) cm. l. Capsule to 8 cm. in diam., 4 cm. high, depressed-globular concave above and below, furrowed between the cocci. Seeds about 2 cm. in diam.

29. EUPHORBIA L.

Herbs, undershrubs or shrubs, with acrid milky juice. Leaves, the lower or all alternate, or the upper or all opposite, simple, margin entire or toothed. Several male flowers and one female flower enclosed within an involucre, a "cyathium." Involucre calyx-like, campanulate to cylindrical, regular or a little unequal, lobes 4-5; glands as many or fewer, outside the lobes and alternate with them. Male flowers within the involucre indefinite in number, stalked. Perianth none or sometimes represented by a

minute scale at the joint. Stamen one, the short filament jointed with the pedicel. Bracteoles within the involucre linear or setaceous, sometimes partly united. Female flower one in the centre of the involucre, pedicel at length lengthened beyond the involucre. Perianth none or of three minute scales. Ovary sessile at the top of the pedicel, 3-celled; styles three, distinct or more or less united, spreading above, entire or divided into two; ovules solitary. Capsule breaking up from the persistent axis into three 2-valved cocci; endocarp horny. Seeds without a caruncle in Jamaican species (present in the naturalized *E. Peplus*), with endosperm; cotyledons flat, broad.

Species about 1000, very widely dispersed in the temperate regions, fewer within the tropics.

A. Glands of the involucre with a petaloid appendage.*

Leaves all opposite, shortly petioled, usually oblique at the base. Herbs or shrubs.

Shrubby, or perennial herbs.

Leaves pointed to blunt, base auriculate-cordate 1. *E. buxifolia*.

Leaves with rounded or emarginate apex..... 2. *E. myrtillifolia*.

Annual weeds.

Upright-growing. Involucres cymose.

Branches, involucre, capsule hairy.

Capsule minutely puberulous with adpressed hairs; seeds pinkish. Appendage minute 3. *E. hirta*.

Capsule densely puberulous; seeds brownish red to ash colour. Appendage evident 4. *E. lasiocarpa*.

Branches, involucre, capsule glabrous.

Cymes terminal with slender branches.

Leaves oblong or obovate, more or less serrulate.

Stipules ciliate..... 5. *E. brasiliensis*.

Stipules glandular-dotted on margin... 6. *E. nirurioides*.

Leaves almost ligulate, mostly entire.... 7. *E. hyssopifolia*.

Cymes axillary. Leaves irregularly elliptical, serrulate..... 8. *E. hypericifolia*.

Prostrate. Involucres mostly solitary, glabrous (sometimes puberulous in *E. thymifolia*).

Stem puberulous along one side only. Capsule hirtellous along the keeled edges, pendent..... 9. *E. prostrata*.

Stem puberulous to glabrate. Capsule puberulous, younger erect..... 10. *E. thymifolia*.

Stem and capsule glabrous..... 11. *E. Blodgettii*.

Leaves alternate, but opposite or ternate at ends of branches. Herbs with hollow jointed stems, constricted at the joints..... 12. *E. Oerstediana*.

Leaves ternate or whorled, sometimes opposite. Shrubs with jointed branches..... 13. *E. nudiflora*.

* Appendage minute in *E. hirta*, sometimes wanting in *E. prostrata* and *E. thymifolia*.

B. Glands of the involucre without a petaloid appendage.

Leaves alternate, but uppermost opposite or whorled.

Annual or biennial herbs.

Leaves: uppermost and bracts with a red blotch at base..... 14. *E. heterophylla*.

Leaves: uppermost and bracts with a whitish blotch at base..... 15. *E. geniculata*.

Leaves wanting, sometimes scale-like, opposite, at the topmost nodes. Shrubs. Stems and branches long-jointed, 2-winged..... 16. *E. alata*.

Leaves alternate, crowded at ends of thickish branches, which bear below the scars of fallen leaves. Small trees.

Involucres cymose-corymbose..... 17. *E. punicea*.

Involucres solitary..... 18. *E. troyana*.

[Leaves alternate below the umbellate inflorescence, leaf-like bracts opposite on the branches of the inflorescence. Herb

E. Peplus.]

A. Glands of the involucre with a petaloid appendage.*

1. ***E. buxifolia*** Lam. *Encyc. ii.* 421 (1786); stems and branches short-jointed, usually erect, woody; leaves somewhat crowded above, often dropping off below, 12–3 mm. l.; involucres solitary, glabrous.—*Descourt. Fl. Ant. vi.* 156, *t.* 418; *Griseb. Fl. Br. W. Ind.* 53; *Boiss. in DC. Prodr. xv. pt. 2,* 15; *Muell. Arg. in Fl. Bras. xi. pt. 2,* 681; *Millsp. in Field Col. Mus. Bot. ii.* 60, 160, 238; *Urb. Symb. Ant. iv.* 353. *E. glabrata* Sw. *Prodr.* 76 (1788). *E. mesembrianthemifolia* Jacq. *Enum. Pl. Carib.* 22 (1760) & *Sel. Stirp. Amer.* 150. *Peplis fruticosa maritima geniculata* Sloane *Cat.* 82 & *Hist. i.* 198. *Chamaesyce buxifolia* Small *Fl. S.E. U.S.* 711 (1903); *Millsp. tom. cit.* 301. Jacquin's name *E. mesembrianthemifolia* is the earliest, but his description is scarcely adequate to decide the identity of his plant. A specimen from Swartz named by him *E. glabrata* is in Herb. Stockholm.

Rocks on sea-shore; Gun Cay, near Port Royal, Sloane Herb. iii. 118! *Houston!* Wright! *Broughton!* Shakspcar! Swartz! Macfadyen! St. Ann; near Holland Bay; Purdie! St. Ann's Bay; Mamme Bay; Prior! March! Savanna Point, Low Layton, Metcalfe! Lucea, Hitchcock; Palisadoes; Healthshire Hills; Long Acre Point, west of Black River; Harris! Fl. Jam. 6751, 9524, 9967, 11,627.—Bermuda, Florida and Keys, Bahamas, West Indies, Central America, Venezuela, Brazil.

A low shrubby glabrous plant, 1–3 ft. high or more. Stems erect to prostrate, erect branches sometimes leafless below, jointed, somewhat swollen at the nodes. Leaves somewhat fleshy, elliptical to ovate, often somewhat folded, pointed to blunt, entire, base slightly unequal, auriculate-cordate. Stipules triangular-ovate, more or less fringed. Involucres few at the ends of branches, solitary, terminal and axillary, about 1·3 mm. l.,

* Appendage rudimentary in *E. hirta*, sometimes wanting in *E. prostrata* and *E. thymifolia*.

campanulate, glabrous outside, hairy at the throat; lobes triangular, fringed; glands concave, appendages whitish-yellow, transversely elliptical, margin somewhat undulating. *Capsule* 3-cornered-globular, slightly keeled, glabrous, 2 mm. in diam. *Seeds* ash colour with a tinge of pink, 1·4(-1·2) mm. l., 1·8 mm. br., angles and markings inconspicuous.

2. *E. myrtillifolia* L. *Syst. ed.* 10, 1048 (1759); erect shrubby perennial plants; leaves obovate-elliptical or roundish, 0·5-1·5 cm. l.; involucres solitary in the upper axils, hairy outside and inside; capsule minutely puberulous.—*Boiss. in DC. Prodr. xv. pt. 2, 38.* *E. myrtifolia* L. *Amaen. v.* 379 (1760) & *Sp. Pl. ed. 2, 653*; *Sw. Obs. Bot.* 197; *Griseb. Fl. Br. W. Ind.* 53. *E. erecta* foliolis &c. *Browne Hist. Jam.* 235. Browne's specimen, the type, is in Herb. Linn.; name in Solander's hand.

Browne! highest mountains, Liguanea, *Broughton!* *Masson!* Blue Mts., *Prior!* Guava Ridge, 2000 ft., *Eggers!* above Gordon Town, *Harris!* *Fl. Jam.* 5196.

Stem 1-2 ft. high; branches long, slender, more or less erect or spreading, reddish, puberulous, becoming glabrate. Leaves shortly stalked, apex retuse, base roundish, puberulous and paler beneath. *Stipules* very short, truncate, fringed. *Involucres* 1·3 mm. l., campanulate; lobes small, triangular, ciliate; glands with a large roundish yellow appendage. *Capsule* 2 mm. in diam., 3-angled-globular, slightly keeled. *Seeds* oblong, acutely 4-angled, wrinkles reticulate.

3. *E. hirta* L. *Sp. Pl.* 454 (1753); stems erect or decumbent at base, or sometimes prostrate, young parts hispid with yellow spreading hairs and pubescent with short curved hairs; leaves 5-5 cm. l., more or less hispid to pubescent; involucres cymose, sparingly puberulous; appendage not evident; capsule minutely puberulous with adpressed hairs; seeds pinkish.—*Jacq. Collect. v. t. 11, f. 1;* *Brown in Fl. Trop. Afr. vi. sect. 1,* 496 (incl. var.). *E. pilulifera* *Jacq. Collect. ii.* 361 (1788) & *Ic. Pl. Rar. t. 478*; *Griseb. Fl. Br. W. Ind.* 54; *Boiss. in DC. Prodr. xv. pt. 2,* 21; *Muell. Arg. in Fl. Bras. xi. pt. 2,* 684; *Millsp. in Field Columb. Mus. Bot. ii.* 61, 164; *Urb. Symb. Ant. iv.* 353 (non L.). *E. capitata* *Lam. Encyc. ii.* 422 (1786); *Descourt. Fl. Ant. iii.* 334, *t. 227.* *E. oblitterata* *Jacq. Enum. Pl. Carib.* 22 (1760) & *Sel. Stirp. Amer.* 151; *Sw. Prodr. 76* & *Fl. Ind. Occ.* 872. *E. procumbens* *DC. Cat. Hort. Monspel.* 111 (1813). *E. pilulifera* v. *procumbens* *Boiss. loc. cit.*; *Millsp. in Bot. Gaz. xxv. 14* with a fig. *Tithymalus dulcis* *parietariae* &c. *Sloane Cat.* 82 & *Hist. i.* 197. *E. reclinata* *minor* &c. *Browne Hist. Jam.* 234. *Tithymalus botryoides* *zeylanicus* &c. *Burm. Zeyl.* 223, *t. 104.* *T. botryoides* *erectus* &c. *Burm. Zeyl.* 224, *t. 105, f. 1.* *E. inermis* *foliis* *oppositis* *ovalibus* &c. *L. Fl. Zeyl.* 88. *Chamaesyce hirta* *Millsp. tom. cit. 303, 402* (1909). Types in Herb. Hermann in Herb. Mus. Brit. and in Herb. Linn. Leaves of *E. oblitterata* from *Jacq.* in Herb. Mus. Brit.

Sloane Herb. iii. 116, lxxxii. 94! *Wright!* *Masson!* *Swartz!* *Macfadyen!* *Distin;* Kingston, *Prior!* March! Port Antonio, *Millspaugh*; Kingston, Lucea, *Hitchcock*; Kingston, *Clute!* Norbrook, *Campbell!* Hope grounds; King's House; Constant Spring to Bardowie. *Harris!* Fl. Jam. 6122, 6640, 6788, 9517, 12,111.—Tropics and in some subtropical areas.

Annual or perennial, $\frac{1}{2}$ - $3\frac{1}{2}$ ft. high. Stems simple or sparingly branched. Leaves ovate-rhombose, or oblong-lanceolate, minutely serrate, acute or subobtuse, base very unequal and cuneate on one side, rounded on the other. Stipules minute. Cymes axillary, stalked, in a globular head, or divided into two or three heads. Involucres very small, 7-1 mm. l., obconical; lobes triangular, hairy; glands erect, about as long as the lobes, linear, apex semiglobular, somewhat concave; appendage minute, dorsal. Capsule 3-cornered-globular, 1-1.2 mm. in diam. Seed oblong, sharply 4-angled, .8 mm. l., transversely wrinkled.

4. *E. lasiocarpa* Klotzsch in *Nov. Act. Nat. Cur. xix. Suppl. i.* 414 (1843); stems erect, grey-pubescent; leaves 1-4 cm. l., grey-pubescent or glabrate; involucres cymose, hairy on outside; capsule densely puberulous; seeds brownish red to ash colour.—*Boiss.* in *DC. Prodr. xv. pt. 2,* 23; *Millsp.* in *Bot. Gaz. xxv. 17*, with fig.; *Urb. Symb. Ant. iv.* 354. *E. hypericifolia* var. *lasiocarpa* *Griseb.* *Fl. Br. W. Ind.* 54 (1859) (excl. syn. *Balb.*). *Chamæsyce lasiocarpa* *Arthur* in *Torreya xi.* 260 (1911); *Millsp.* in *Field Columb. Mus. Bot. ii.* 397.

Macfadyen! St. Andrew, *McNab!* Kingston, *Prior!* Robertsfield; David's Hill; Cinchona; road to Constitution Hill; Mount Pleasant, Stony Hill, 1200 ft.; Constant Spring to Bardowie, 800 ft.; *Harris!* Fl. Jam. 5515, 8595, 9029, 11,136, 12,113.—Florida, Central America, Peru.

Annual, $\frac{1}{2}$ -3 ft. high. Stems erect, branching, with somewhat long internodes. Leaves oblong-elliptical to oblong-lanceolate, obtuse, base rounded or subcordate, denticulate, uppermost smaller and narrower. Stipules to 1 mm. l., triangular. Cymes terminal, densely corymbose, with a pair of leaf-like bracts at base. Bracts 1-1.2 mm. l., linear, acute. Involucres 1.5 mm. l., obconical-campanulate, hairy on outside; lobes entire, narrowly triangular; appendage of the glands white, somewhat semicircular, with entire sinuate or slightly lobed margin broader than the glands. Capsule ovate-roundish, 2 mm. in diam. Seeds elongated-ovate, obtusely 4-angled, with distinct prominent wrinkles, 1.1 mm. l.

5. *E. brasiliensis* Lam. *Encyc. ii.* 423 (1786); stem erect, much branched, flowering branches very slender; leaves oblong to linear-oblong, blunt, more or less serrulate, especially above, .8-3 cm. l., those of the flowering branches narrow; cymes terminal, lax, heads few, intermixed with linear bracts; appendages large, white; capsule 2-2.2 mm. in diam.; seeds black with lighter angles and 2-3 transverse ridges.—*Boiss.* in *DC. Prodr. xv. pt. 2,* 24 (in part); *Muell. Arg. in Fl. Bras. xi. pt. 2,* 676 (in part); *Millsp.* in *Field Columb. Mus. Bot. ii.* 65, 159. *Chamæsyce brasiliensis* *Small Fl. S.E. U.S.* 712 (1903); *Millsp.* *tom. cit. 302.*

Pasmore in *Herb. Sloane clxii.* 129! *McNab!* Green Valley, 1800 ft.; Grove, St. Andrew; road to Constitution Hill, 1500 ft.; Constant Spring

to Bardowie, 800 ft.; *Harris!* Fl. Jam. 5457, 6840, 9035, 12,112; near Kingston, 500 ft. *Clute!* near Port Antonio, *Millspaugh*.—Bahamas, West Indies, tropical continental America.

Annual, glabrous, 8–14 inches high. Leaves subsessile. Stipules short, ciliate, triangular, somewhat truncate, broad in outline. Involucres about 1·5 mm. l., campanulate, glabrous on the outside; lobes triangular-lanceolate, ciliate; appendages obovate-roundish or transversely elliptical. Coccii slightly keeled. Seed ovoid-4-angled.

6. *E. nirurioides* comb. nov.; stems erect or ascending, red, woody; leaves obovate to oblong, obtuse, serrulate, especially at the upper third; stipules deltoid, thick, margin glandular-dotted, 8–9 mm. l.; cymes terminal, dense; appendages white or pink, roundish; seeds blackish with yellowish angles, with a few indistinct and incomplete ridges.—*Chamaesyce nirurioides Millsp.* in *Field Columb. Mus. Bot. ii.* 394 (1914). Type in Field Mus. Herb.

Malvern, *Britton*, 1186!

Annual; plants low, glabrous; branches 5–10 cm. l. Leaves 3-nerved. Petiole very short. Involucres long-stalked, campanulate, glabrous; lobes elongate-triangular, ciliate at apex; glands waxen, roundish, cupped; appendages thrice the diameter of the glands, entire or mostly so. Capsule glabrous; cocci rounded. Seeds triangular-ovoid, 1 mm. l., 8 mm. br.

Near *E. brasiliensis*, from which it is readily distinguished by its yellowish seed-angles, glandular-dotted stipules, and a striking resemblance in habit to *Phyllanthus Niruri*.

The description is taken from *Millspaugh*. We have seen only a small portion of Dr. *Britton's* original specimen presented by him to *Herb. Mus. Brit.*

7. *E. hyssopifolia* L. *Syst. ed. 10*, 1048 (1759) & *Sp. Pl. ed. 2*, 651; stem erect, simple or branched, somewhat flexuose, branches spreading and somewhat dichotomous, flowering branches very slender; leaves narrowly oblong, blunt, almost ligulate, mostly entire, sometimes sparingly toothed, 1–3 cm. l.; smaller (becoming bracts) on flowering branches; cymes mostly terminal, lax; appendages large, white (or pink); capsule 2–2·5 mm. in diam.; seeds olive-green, with few very inconspicuous transverse ridges.—*Urb. Symb. Ant. iv.* 355. *E. dichotoma* &c. *Browne Hist. Jam.* 235. *E. hypericifolia* L. var. *hyssopifolia* *Griseb. Fl. Br. W. Ind.* 54 (1859). *E. brasiliensis* *Lam. var. hyssopifolia* *Boiss. in DC. Prodr. xv. pt. 2*, 24 (1862); *Fawc. Fl. Pl. Jam.* 34. *Chamaesyce hyssopifolia* *Small Bull. N.Y. Bot. Gard. iii.* 429 (1905) & *Fl. S.E. U.S. ed. 2*, 1349; *Millsp.* in *Field Columb. Mus. Bot. ii.* 397. Browne's specimen, the type, is in *Herb. Linn.*

Lane in *Herb. Sloane clxii.* 130! *Browne!* *Kingston, Prior!* *Green Valley*, 1800 ft.; *Grove, St. Andrew*; road to *Constitution Hill*, 1500 ft.; *Harris!* Fl. Jam. 5457, 6840, 9035.—Cuba, Is. of Pines, Hispaniola, Porto Rico, Guadeloupe, Martinique, Grenada, Curaçao, Florida, tropical continental America.

Annual or perennial, 1·5–3·5 dm., and more, high. Branches glabrous or hairy at apex. Petiole very short. Stipules .5 mm. l., triangular, somewhat cut. Involucres obconical-campanulate, about 1 mm. l., glabrous; lobes triangular; appendages roundish, entire ("seldom entire" Millsp.). Capsule 3-cornered-ovate-globular, glabrous. Seeds ovoid, 4-angled, 1·3 mm. l.

S. E. *hypericifolia* L. Sp. Pl. 454 (1753); stem erect, simple or branched; leaves irregularly elliptical to oblong, blunt to rounded, serrulate (sometimes sparingly so), 1–3·5 cm. l.; cymes axillary in racemose clusters with few or many involucres, generally with two leaf-like bracts at apex of peduncle; capsule usually small, about 1·5 mm. in diam.; seeds reddish-brown to

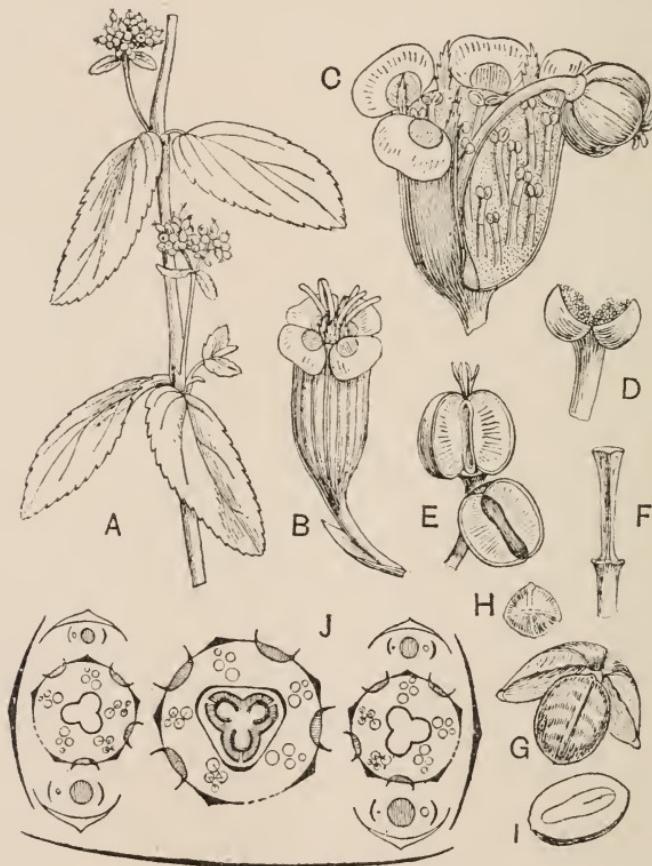


Fig. 113.—*Euphorbia hypericifolia* L.

A, Part of flowering branch $\times \frac{2}{3}$.

B, Cyathium $\times 16$.

C, Cyathium cut open $\times 24$.

D, Stamen.

E, Capsule $\times 10$.

F, Columella of capsule.

G, Coccus with seed.

H, Seed.

I, Ditto cut lengthwise.

J, Diagram of partial inflorescence.

(D, F-I much enlarged.)

grey, transversely ridged.—*Hook. Exot. Fl.* i. t. 36; *Griseb. op. cit.* 54 (excl. var. β and γ); *Baill. Étud.* t. 1, f. 30; *Boiss. tom. cit.* 23; *Millsp. in Field Columb. Mus. Bot. ii.* 64, 163, 395; *Urb. Symb. Ant.* iv. 354; *Brown in Fl. Trop. Afr.* vi. sect. 1, 498 & *Fl. Cap.* v. sect. 2, 248. *E. pilulifera L. Sp. Pl.* 454 (1753), *Amen.* iii. 115 & *Herb.* (excl. syn. *Burm.*) (non *auct.*). *E. minima* *reclinata* &c. *Browne Hist. Jam.* 235. *E. inermis* *foliis oppositis oblique* &c. *L. Fl. Zeyl.* 89 & *Hermann's specimen no. 198 in Herb.* i. 74. *Tithymalus erectus acris* &c. *Sloane Cat.* 82 & *Hist.* i. 197, t. 126. *Chamaesyce hypericifolia Millsp. tom. cit.* 302 (1909). (Fig. 113.) A specimen from Swartz in *Herb. Stockholm.*

Sloane Herb. iii. 117, lxxxii. 94! *Wright!* *Broughton!* *Swartz!* *Bancroft!* *Distin!* pastures, St. Andrew, *McNab!* cane-fields, St. Thomas in the East, *Purdie!* *Metcalfe!* Port Antonio, *Millspaugh;* Constant Spring, Bog Walk; Port Morant; Port Antonio; Lucea; *Hitchcock;* King's House, *T. J. Harris!* Hope, 600 ft.; Stony Hill, 1200 ft.; near Troy, 1800 ft.; *Harris!* *Fl. Jam.* 6778, 6803, 11,134, 12,646.—Widely distributed throughout tropical and subtropical regions.

Annual 3-18 inches high. *Stems* glabrous, or rarely young parts minutely puberulous. *Leaves* glabrous or slightly pubescent; petiole very short. *Stipules* variable, usually 1-2 mm. l., ovate to lanceolate, serrate to fringed. *Bracts* linear, acuminate, 1-1·4 mm. l. *Involucres* about 1 mm. l., campanulate, glabrous or puberulous; lobes awl-shaped, ciliate; glands with a white, transversely elliptical appendage. *Capsule* 3-cornered-globular, glabrous. *Seeds* 4-angled, about 1 mm. l.

An infusion of the dried leaves is recommended as a remedy in diarrhoea, dysentery, &c., affecting the system as an astringent and feeble narcotic (Watt).

9. *E. prostrata* *Ait. Hort. Kew.* ii. 139 (1789); prostrate, branches minutely puberulous along a median line on the upper side; involucres axillary, glabrous, each with two leaf-like bracts, forming a very short raceme, sometimes the internodes are very short, and there is a cluster of two or three, each with its bracts; capsule hirtellous along the keeled edges, otherwise glabrous, 1 mm. or more in diam.; seeds pale red or purplish, acutely 4-angled, with about six transverse ridges.—*Griseb. Fl. Br. W. Ind.* 53; *Boiss. in DC. Prodr.* xv. pt. 2, 47 & *Ic. Euphor.* t. 17; *Muell. Arg. in Fl. Bras.* xi. pt. 2, 683; *Millsp. in Bot. Gaz.* xxv. 19, with a fig. & *Field Columb. Mus. Bot. ii.* 66, 164; *Urb. tom. cit.* 356; *Brown in Fl. Trop. Afr.* vi. sect. 1, 510 & *Fl. Cap.* v. sect. 2, 245. *E. minima* &c. *Browne Hist. Jam.* 236. *Chamaesyce prostrata Small Fl. S.E. U.S. States* 713 (1903); *Millsp. tom. cit.* 303, 406. Type in *Herb. Mus. Brit.* Browne's specimen in *Herb. Linn.* is named *E. Chamaesyce* by Linnæus.

Lane in *Herb. Sloane* clxii. 130! *Browne!* *Wright!* *Broughton!* *Distin!* *Kingston!* *Prior!* *March!* *Arnott!* J.P. 1007, *Morris!* *Jackson Town,* *Miss A. Moulton-Barrett!* *New Market,* 1150 ft.; *Hope grounds,* 700 ft., *Harris!* *Fl. Jam.* 9882, 11,803.—Native of tropical America, whence it has been introduced into other tropical and subtropical regions.

Annual. *Stems* 5-2 dm. l., with numerous slender branches. *Leaves*

3-7 mm. l., elliptical or oblong-elliptical, or slightly obovate-elliptical, apex rounded or obtuse, base more or less oblique, subsessile, minutely toothed, in the upper part glabrous, or sparingly puberulous, especially beneath and at apex. *Stipules* triangular, on the upper side usually free, on the lower side united. *Involucres* about .6 mm. l. (peduncles .6-2 mm. l.), campanulate; lobes ovate, ciliate-fringed; glands minute; appendage slightly broader than the gland or wanting. *Capsules* 3-cornered-globular, 1-1.4 mm. in diam. *Seeds* ovoid-ellipsoidal, about 1 mm. l.

* 10. *E. thymifolia* L. *Sp. Pl.* 454 (1753); prostrate; branches puberulous to glabrate; involucres axillary, glabrous or puberulous, crowded through the shortness of the internodes into very short leafy racemes; younger capsules erect, about 1.4 mm. in diam., puberulous; seeds reddish, acutely 4-angled, with about four transverse ridges.—*Burm. f. Fl. Ind.* 112; *Boiss. in DC. Prodr. xv. pt. 2, 47*; *Muell. Arg. in Fl. Bras. xi. pt. 2, 684*; *Watt Dict. Econ. Prod. Ind.*; *Urb. Symb. Ant. iv. 356*. *E. maculata* L. var. *thymifolia* *Griseb. Fl. Br. W. Ind.* 53. *Chamaesyce Sloane Cat.* 83 & *Hist. i.* 198. *Chamaesyce thymifolia* *Millsp. in Field Columb. Mus. Bot. ii.* 412 (1916). *Tithymalus humilis ramosissimus* &c. *Burm. Zeyl.* 225, *t. 105, f. 3*.

St. Jago de la Vega, *Sloane Herb.* iii. 119! *Masson!* *Macfadyen!*—All hot countries except Australia.

Stems slender, with many branches, $\frac{1}{2}$ to 1 ft. and more. *Leaves* 4-9 mm. l., oblong or oblong-elliptical, obtuse, serrulate-crenate, glabrous or puberulous beneath. *Stipules* about 1 mm. l., lanceolate, fringed. *Involucres* campanulate-obconical, deeply cut on one side, hairy, with long hairs inside; lobes triangular, acute, ciliate; glands small, stalked, appendage as broad or narrower or wanting, those of the glands next the lateral slit sometimes somewhat oblong or ligulate, larger than the gland. *Capsule* very shortly stalked, obtusely keeled. *Seed* oblong, 1 mm. l. or less.

Used like *E. hypericifolia*.

11. *E. Blodgettii* *Engelm. ex Hitchc. in Rep. Miss. Bot. Gard. iv. 126, t. 13* (1893); glabrous or nearly so; prostrate, spreading, or rarely erect; involucres axillary, usually solitary or two together; capsule 1.5-2 mm. in diam.; seeds reddish to grey, inconspicuously transversely ridged.—*Urb. Symb. Ant. vi. 90*. *Chamaesyce Blodgettii* *Small Fl. S.E. U. States*, 712 (1903); *Millsp. tom. cit. 303*.

Palisadoes, also in pastures, *Broughton!* Fort Clarence Hill; Pedro Bluff; *Harris!* Fl. Jam. 9536, 9731; Lucea, *Hitchcock*.—Bermuda, Key West and S. Florida, Bahamas, Cayman Is., Cuba.

Annual or biennial. Stem 3-17 inches, branched, woody below. Leaves 3-13 mm. l., irregularly elliptical, or slightly obovate elliptical, apex rounded, more or less serrulate towards the apex. *Stipules* triangular, margin cut. *Involucres* about .7 mm. l., campanulate, glabrous outside, hairy within; lobes triangular, toothed; appendages white or pinkish, as broad as, or slightly broader than, the gland. *Capsule* 3-cornered-globular, slightly keeled, glabrous. *Seeds* about 1 mm. l., 4-angled. The leaves are mostly small and entire on exposed sea-shores, larger and toothed amongst grass or in shade.

12. *E. Oerstediana* Boiss. in *DC. Prodr.* xv. pt. 2, 59 (1862); herbs; stems hollow-jointed, constricted at joints; leaves alternate but opposite or ternate at ends of branches; stipules rudimentary; cymes terminal, corymbose; glands 2, with two lips—the outer with only a narrow edge free; the appendage equaling the inner lip; seeds mammillose-tuberculate in longitudinal lines.—*Urb. Symb. Ant.* v. 393 & vi. 90. *Poinsettia Oerstediana* Klotzsch & Gacke in *Monatsb. Akad. Berl.* 1859, 253 (name only) & in *Abh. Akad. Berl.* 1859, 103 (1860). *E. geniculata* Eggers *Flor. St. Croix & Virg. Isl.* 93 (1879); *Kew Bull.* 1893, 274; (non Ortega).

Cane River valley; Castleton grounds; *Harris!* Fl. Jam. 10,067, 12,075.—St. Thomas, St. Cruz, Martinique, St. Vincent, Barbados, Grenada, Tobago, Central America (fide Oersted).

Plant, 12–15 inches high. Leaves 3·5–7·5 cm. l., 1·5–4 cm. br., oblong-elliptical, or ovate to ovate-lanceolate, sometimes somewhat acuminate, puberulous beneath; petiole generally 1·5–2·5 cm. l., uppermost often shorter. Involucres long-stalked, narrowly campanulate, glabrous; lobes truncate with a comb-like fringe. Capsule minutely puberulous. Seeds ellipsoidal, 2·5 mm. l.

13. *E. nudiflora* Jacq. *Coll. iii.* 180 (1789) & *Ic. Rar. t. 479*: shrub with jointed branches; leaves in whorls of 3 or 4, sometimes opposite; stipules gland-like; cymes terminal and axillary, dichotomous; seeds irregularly wrinkled-tuberled.—*Griseb. Fl. Br. W. Ind.* 52; *Boiss. in DC. Prodr.* xv. pt. 2, 61. *E. graminea* Sw. *Obs. Bot.* 196 (1791) (non Jacq.). *E. trichotoma*, foliis &c. *Browne Hist. Jam.* 235.

Broughton! Swartz; *Bancroft!* Bertero; *Wilson!* Liguanea Hills, *Prior!* March; Hope River, *Eggers!* Gordon Town, *Clute!* Windward Road, *Fawcett!* Berwick, *Harris!* Fl. Jam. 5106.—St. Vincent, Colombia.

Shrub 6–10 ft. high. Branchlets 3-2-forked. Leaves 3–5 cm. l. and longer, ovate or ovate-oblong, or elliptical, sometimes oblanceolate, apex blunt, base rounded or blunt, lighter and sparingly puberulous beneath, especially on midrib and nerves; petiole 1·5–1 cm. l. Involucres 10–16 in a cyme, pedicellate, puberulous, hemispherical; lobes obovate-spathulate, fringed; glands 5, 2-lipped, green, transversely oblong, inner lip shorter than the other; appendage broader than the gland, white, crenate-dentate. Capsule glabrous, long stalked, 3·5 mm. l. Seed 3 mm. l.

B. Glands of the involucre without a petaloid appendage.

14. *E. heterophylla* L. *Sp. Pl.* 453 (1753); erect or ascending annual or biennial herbaceous weed; leaves of various shapes, lower leaves alternate, uppermost opposite or whorled with a red blotch at the base; bracts also red; stipules gland-like; cymes terminal, corymbose; glands cup-shaped, solitary.—*Bot. Reg. t. 765*; *Griseb. Fl. Br. W. Ind.* 54; *Boiss. in DC. Prodr.* xv. pt. 2, 72; *Muell. Arg. in Fl. Bras. xi. pt. 2,* 695; *Urb. Symb. Ant.* iv. 357. *Mills* in *Field Columb. Mus. Bot. ii.* 64, 162. *E. inermis*

foliis &c. *Plum. Pl. Amer. (Burm.) t. 251, f. 3.* *Poinsettia heterophylla Klotzsch & Garcke in Monatsb. Akad. Berl. (1859) 253:* *Millsp. tom. cit. 304;* *Small Fl. S.E. U. States, 722.*

Wilson; March! J. P. 698, Jenman! Hope grounds; near Brown's Town, 1000 ft.; Inverness, Clarendon, 200 ft.; near Bath; Spur Tree Hill, 2600 ft.; *Harris!* Watson Hill, *Fawcett! Fl. Jam.* 5778, 6868, 6981, 7082, 8398, 10,079, 11,692, 11,957, 12,386. Constant Spring; Port Morant; *Hitchcock*.—Bermuda, Bahamas, W. Indies, continental tropical and subtropical America.

Herb 1-3 ft. high. Leaves 2-14 cm. l., of various forms, elliptical, ovate, lanceolate, linear, or more or less fiddle-shaped, entire or serrate-sinuate. Involucres pedicellate, campanulate, glabrous; lobes fringed. Capsule 3-lobed, glabrous, about 4 mm. in diam. Seed black, ovate with truncate base, tubercled, tubercles often forming small crests, 2.5 mm. l.

The following forms are noted by authors, but the distinguishing marks are often seen in combination on the same plant:—

Var. *eyathophora* *Griseb. Fl. Br. W. Ind.* 54 (1859); leaves fiddle-shaped with two lobes, or elliptical, or ovate, entire.—*Boiss. loc. cit.* *E. eyathophora Murr. in Comm. Goetting.* vii. 81, t. 1 (1786); *Jacq. Ic. Rar.* t. 480.

Var. *graminifolia* *Engelm. in Torr. Bot. Mex. Bound.* 190 (1859); leaves all, or almost all, linear-lanceolate, usually entire and more hairy beneath.—*Millsp. in Bot. Gaz.* xxv. 23, with fig. (1898). *E. graminifolia Michx. Fl. Bor. Am. ii.* 210 (1803).

15. *E. geniculata* *Ort. Hort. Matr. Dec.* 18 (1800); plant much like *E. heterophylla*, but leaves all of the same shape, elliptical or oblong; uppermost leaves and the bracts with a whitish blotch; involucres subsessile, cylindrical-turbinate.—*Boiss. in DC. Prodr.* xv. pt. 2, 72. *E. prunifolia Jacq. Hort. Schoenb.* iii. t. 277. *E. heterophylla L. var. prunifolia Griseb. Fl. Br. W. Ind.* 54 (1859). *Poinsettia geniculata Klotzsch & Garcke tom. cit. 101* (1859); *Small loc. cit.*

Wilson; March (fide Grisebach).—Tropical continental America.

Examination of a larger series of specimens may prove this plant to be, as Grisebach suggests, merely a variety of *E. heterophylla*.

[*E. pulcherrima Willd. ex Klotzsch in Otto & Dietr. Allg. Gartens* ii. 27 (1834); *Boiss. in DC. Prodr.* xv. pt. 2, 71; *Urb. Symb. Ant.* iv. 356. *Poinsettia pulcherrima Grah. in Edinb. N. Phil. Journ.* xx. 412 (1836); *Bot. Mag.* t. 3493.]

Poinsettia.

This well known species is a native of Central America, and is cultivated throughout the West Indies.]

16. *E. alata* *Hook. Ic. Pl.* t. 700 (1844); shrub; stems and branches long-jointed, erect, 2-winged; leaves wanting or some-

times scale-like, opposite, at the topmost nodes.—*Griseb. Fl. Br. W. Ind.* 52; *Boiss. in DC. Prodr. xv. pt. 2*, 76. *Pyretrum aphyllon Plum. Pl. Amer. (Burm.) t. 234, fig. 1.* Type in Herb. Kew.

Rocky wood above Christiana, Purdie! near Troy, 2500 ft. *Harris!* *Fl. Jam.* 9098.

Plant, 1-8 ft. high, glabrous; *stems* woody, terete, glaucous-green; branches in whorls of three or more, more or less drooping, compressed. *Involucres* solitary or in clusters, terminal, and at the nodes near the ends of branches; terminal cluster of three involucres, or composed of two involucres below opposite, and of three terminal, with narrow leaf-like bracteoles; involucres glabrous, hairy inside; lobes fringed with minute teeth; glands fleshy; appendages roundish. Probably diœcious. *Male flowers* only known. *Capsule* not known.

17. *E. punicea* Sw. *Prodr. 76* (1788) & *Fl. Ind. Occ.* 873; small trees; branches rather thick, leafy at the ends, leafless below and marked with the scars of the fallen leaves; leaves oblanceolate to obovate; bracts scarlet; cymes corymbose with one or several heads, subterminal or from the axils at the extreme ends of branches; glands outside the involucre, below the margin.—*Jacq. Collect. iii. 179* & *Ic. Pl. Rar. t. 484*; *Ait. Hort. Kew. ii. 143*; *Sm. Ic. Pict. t. 3*; *Bot. Reg. t. 190*; *Bot. Mag. t. 1961*; *Descourt. Fl. Ant. iii. 191*, *t. 194*; *Griseb. Fl. Br. W. Ind.* 54; *Boiss. in DC. Prodr. xv. pt. 2*, 105; *Millsp. tom. cit. 164*; *Urb. Symb. Ant. v. 394, obs. & 395, fig. A, B.* *Poinsettia punicea* *Klotzsch & Garcke in Monatsb. Akad. Berl.* (1859) 102. *Euphorbiadendron puniceum* *Millsp. tom. cit. 305* (1909).

Wild Physic Nut.

Shakspear! Swartz; Waters! Wilson! J.P. 1034, Liberty Hill, St. Ann, *Miss Stennett!* Dolphin Head, 1600 ft.; Stanmore Hill, 2200 ft.; near Malvern, 2200 ft.; Negril woods, near lighthouse, 300 ft.; Peckham woodland, Clarendon, 2500-2800 ft.; Mt. Pleasant, Stony Hill, 1100 ft.; *Harris!* *Fl. Jam.* 9267, 9962, 9985, 10,241, 10,865, 11,146.—Bahamas, Cuba.

Tree, 12-30 ft., to 9 inches in diam., abounding in acrid milky juice, much branched, glabrous. *Leaves* 7-15 cm. l., 2-3 cm. br., apex obtuse, sometimes acute, mucronulate, gradually narrowing to a very short petiole, when dry membranous, those nearest the corymbs sometimes more or less coloured. *Bracts* 2-3, 1.5-4 cm. l., elliptical to obovate. *Involucre* 6-7 mm. l., cylindrical-campanulate; lobes very short, triangular, sub-acuminate, entire; glands 4-6, campanulate, attached at the back. *Styles* united beyond the middle, branches entire. *Capsule* about 1 cm. in diam. *Seeds* ovate, apiculate (*fide Boissier*).

18. *E. troyana* *Urb. Symb. Ant. v. 394*, with fig. (1908); small trees; branches rather thick, leafy at the ends, leafless below and marked with the scars of the fallen leaves; leaves narrowly oblong to oblong-lanceolate, sometimes oblanceolate; bracts scarlet; involucres solitary at the apex of branches; glands situated outside, near the middle of the involucre, decurrent.—*Euphorbiadendron troyanum* *Millsp. loc. cit.* (1909).

Near Troy, 2000-2500 ft.; Peckham Woods, Clarendon, 2500 ft.; Harris! Fl. Jam. 8751, 9078, 10,970.

Tree 20-30 ft. high. *Leaves* 4-8 cm. l., 7-15 cm. br., apex rounded, mucronulate, entire, leathery. *Bracts* 3 to several, obovate (sometimes oblong), 1.5-3 cm. l. *Involucres* sessile or rarely with a pedicel (3 mm. l.), subcylindrical, 5-6 mm. l., glabrous outside; lobes 8, apiculate; glands 8, campanulate, fleshy. *Style* with trifid apex. *Capsule* (immature) 1.1-1.2 cm. l., glabrous, smooth.

[*E. Peplus L. Sp. Pl.* 456 (1753); an annual herb; leaves elliptical, obovate, or roundish, tapering into the petiole, alternate below the umbellate inflorescence; leaf-like bracts sessile, broadly deltoid-ovate, opposite on the branches of the umbel; involucres solitary, in the forks, or axillary, or terminal; glands on the margin, 2-horned.—*Syme Eng. Bot. viii.* 111. t. 1265; *Fl. Dan.* t. 1100; *Reichb. Ic. Germ.* t. 4775; *Griseb. Fl. Br. W. Ind.* 54; *Boiss. in DC. Prodr.* xv. pt. 2, 141; *Millsbaugh tom. cit.* 67.]

Port Royal Mts., McNab! March; Cinchona, 5000 ft.; Kingston; Clute! Cinchona, Harris! Fl. Jam. 8580. Blue Mt. Peak, Hitchcock. A weed of cultivation throughout Europe and Russian Asia.

Herb, 3-15 inches high, erect, branching, glabrous. *Leaves* (5-2 cm. l.) and bracts entire, glabrous. *Umbel* usually 3-rayed, often with one or more ray-like branches below it. *Involucres* cup-shaped, glabrous; lobes 5, oblong, minutely fringed; glands 4, transversely oblong, with an awl-shaped horn at each end. *Styles* short, each with two branches. *Capsule* about 2 mm. in diam., 3-cornered, with two very narrow wings along each angle, glabrous. *Seeds* about 1.5 mm. l., oblong, slightly 6-angled, with three or four pits on the four outer faces, and a longitudinal groove on the two inner faces, grey-coloured; caruncle yellowish.]

30. PEDILANTHUS Neck.

Shrubs with fleshy branches and milky juice. Leaves alternate, entire; leaf-like bracts opposite; stipules represented by small glands. Several male flowers and one female flower enclosed within an involucre, a "cyathium." Involucres oblique, shoe-shaped; the tube fissured above and notched below at the mouth, made up of two main broad lobes, free above (the fissure) and united on the opposite side nearly to the apex (the notch), with two lateral and one median accessory lobes more or less closing the fissure, the two lateral lobes shorter and more or less united with the main lobes along their fissural margin, the fifth lobe partially united with the base of the lateral lobes or sometimes entirely free. Appendix at the base of the tube, extending above the lower end of the fissure, swollen below, 2- or 3-lobed at the apex, but in Jamaican species two lobes appear to be united almost or quite to the apex. Glands 4, two inside the lower part of the appendix, and two near the junction of the appendix and the tube. Male flowers within the involucre, numerous. Perianth none. Stamen 1, the short filament jointed with the

pedicel. Female flower solitary in the centre of the involucre. Perianth of three minute scales or wanting. Ovary sessile at the top of the pedicel, 3-celled; styles united into a long protruding column, very shortly free at the apex, the branches entire or 2-cleft. Ovules solitary in each cell. Capsule breaking up elastically from the persistent axis into three 2-valved cocci. Seeds with endosperm; caruncle wanting; cotyledons broad.

Species 31, natives of tropical America from Mexico to northern Brazil and the West Indies.

Leaves and involucres hoary..... 1. *P. Grisebachii*.
Leaves and involucres not hoary.

Leaves obovate to oblanceolate 2. *P. jamaicensis*.
[Leaves ovate to ovate-orbicular *P. latifolius*.]

1. *P. Grisebachii* Millsp. & Britton in Field Col. Mus. Bot. ii. 361 (1913); leaves narrowly lanceolate to linear, narrowed to the base, hoary, 1-3 cm. l., 3-4 mm. br.; involucres hoary

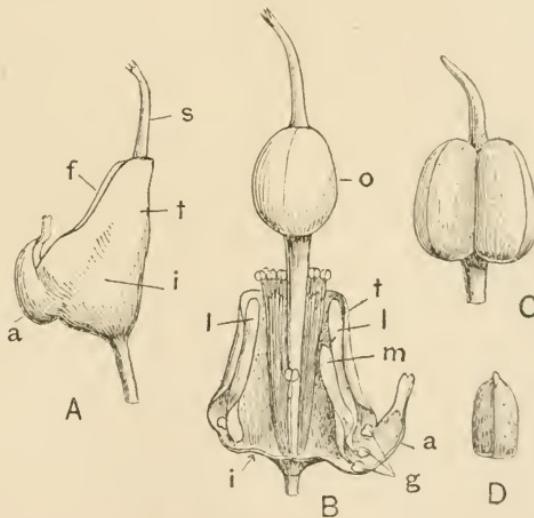


Fig. 114.—*Pedilanthus*.

A, Cyathium of *P. jamaicensis* Millsp. & Britton $\times 2$.

B, Ditto of an older flower of same $\times 2$; *i*, involucre with *f*, fissure; *a*, appendix with *g*, glands; *t*, tube of involucre; *l*, lateral lobe; *m*, median

lobe; *o*, ovary ripening into the capsule; *s*, stylar column.

C, Capsule of *P. Grisebachii* Millsp. & Britton $\times 3$.

D, Seed of ditto $\times 3$.

without, glabrous within; male pedicel glabrous, female pedicel puberulous. (Fig. 114, c, d.) Type in Herb. N. York Bot. Gard.

Long Mt. above Rock Fort, Broughton! near Bull Bay, Harris! also Britton 3677! Fl. Jam. 9645, 12,117.—Porto Rico (sive Millspaugh).

Shrubby plant, 3-6 ft. high. Leaves only on the young branches. Cymes terminal on the branches. Involucres 6.5-9 mm. l., scarlet; tube

truncate at the apex; main lobes broad, lateral strap-shaped, free for only about 1·3 mm. from apex, hairy along the margins, fifth lobe spatulate-strap-shaped, free about 3 mm. from apex, fringed. Appendix about 6 mm. l. Capsule minutely puberulous, about 5 mm. l. Seeds about 3·5 mm. l., ellipsoidal, apiculate.

2. *P. jamaicensis* Millsp. & Britton in *Field Col. Mus. Bot. ii.* 356 (1913); leaves obovate to oblanceolate, narrowed to the short petiole, minutely puberulous or glabrate, 3–10 cm. l.; involucres glabrous within and without, but ciliate on margins; male and female pedicels glabrous.—*P. tithymaloides* Poit. var. *angustifolius* Griseb. (Fig. 114, a, b.) Type in Herb. N. York Bot. Gard.

Swartz! *Distin!* Negril, woods near lighthouse, Britton and Hollick, 2067; also *Harris!* Fl. Jam. 10,238.

Trailing shrubby plant, with stems 10–12 ft. in length, glabrous. *Cymes* terminal and axillary. *Involucres* about 1 cm. l., scarlet; tube-wall thin, the fissure open down to the appendix; notch about one-fourth the length of the tube, main lobes ovate, free part broad, rounded, lateral rectangular-oblong, about 2 mm. free at apex, median lobe about 3 mm. free, all ciliate. *Appendix* 6–7 mm. l., apex truncate, retuse, margin ciliate. *Male flowers* exserted pedicels 10–11 mm. l., filaments about 2·5 mm. l. *Style* branches 2-cleft.

[*P. latifolius* Millsp. & Britton in *Ann. Miss. Bot. Gard. ii.* 43 (1915); leaves ovate to ovate-orbicular, subsessile, apex acute, base roundish or subcordate, glabrous, 11·5 cm. l. or less; involucres glabrous without and within; male and female pedicels glabrous.

Near Bath, Britton, 3491. — Cuba, Hispaniola, Mona, Bermuda. Perhaps indigenous at Sanchez, S. Domingo; at all the other localities an evident escape from cultivation, or in gardens (Millsp. and Britton).

Shrubby, about 6 ft. high, young branches zig-zag, puberulent. *Cymes* terminal. *Involucres* about 2 cm. l.; main lobes lanceolate-oblong, rounded obtuse, lateral about equal, all ciliate, median lobe elongate-ligulate, truncate, ciliate, somewhat shorter than the lateral lobes and nearly closing the fissure of the tube. *Appendix* about one-third the length of the tube, split for half its length into two fleshy ligulate slightly grooved and emarginate lobes.]

FAMILY CALLITRICHACEÆ.

Species of Callitrichæ are found in Cuba and Hispaniola, and it is possible that the genus may occur in Jamaica. They are small terrestrial or aquatic plants with simple entire opposite leaves. The flowers are minute, unisexual, axillary, solitary, without sepals or petals, but generally with two bracts. The male flower consists of a single stamen; the female of a 4-celled ovary with two styles, each cell containing one pendulous ovule. The fruit is indehiscent, 4-celled, 4-seeded. The seeds are pendulous, with fleshy endosperm; embryo axile, terete.

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(Synonyms in italics)

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